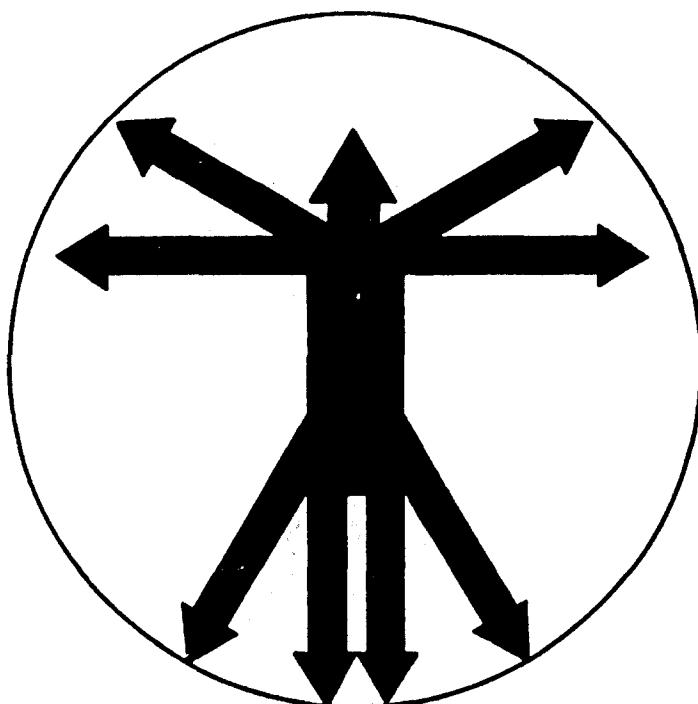


LEVEL

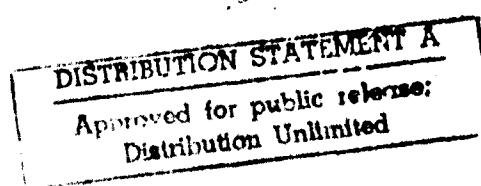
10
C

A COMPARISON OF SELECTED INTERNATIONAL ANTHROPOMETRIC MEASUREMENTS

MA 103181



FILE COPY



81 8 18 117

(6) A COMPARISON OF SELECTED
INTERNATIONAL ANTHROPOMETRIC
MEASUREMENTS

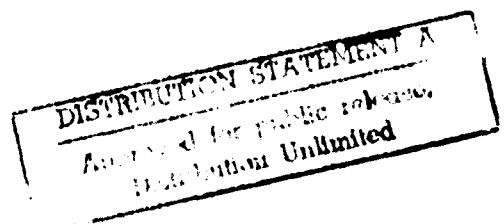
(11) 27 Jun 78

(12) 52

(10) By
R.J. Del Vecchio, [REDACTED]
G.J. Fox
R.J. Barth, Jr.

Prepared Under
Technical Overhead Project 105-609

(14) EG-SDAI-78-51



388847 911

| CONTRACT REQUIREMENTS | CONTRACT ITEM | MODEL | CONTRACT NO |
|-----------------------|---------------|-------|-------------|
| | | | |

REPORT

NO EG-SDAI-78-51 DATE June 27, 1978

A COMPARISON OF SELECTED INTERNATIONAL
ANTHROPOMETRIC MEASUREMENTS

TECHNICAL OVERHEAD PROJECT

105-609

CODE 26512

R. J. Del Vecchio, Ph.D.
G. J. Fox
R. J. Barth, Jr.

PREPARED BY

TECHNICAL APPROVAL

CHECKED BY

APPROVED BY *Gerald J. Fox*

DEPARTMENT Engineering

APPROVED BY *Herman S. Binder* *H.S.B.*

SECTION SDA & I/Life Sciences

APPROVED BY *Fred Berger* *FB*

REVISIONS

| DATE | REV BY | REVISIONS & ADDED PAGES | REMARKS |
|------|--------|-------------------------|---------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

CONTENTS

| <u>Section</u> | | <u>Page</u> |
|----------------|---|-------------|
| 1 | INTRODUCTION | 1-1 |
| 2 | POPULATION DESCRIPTIONS AND SURVEY REFERENCES | 2-1 |
| 3 | ANTHROPOMETRIC MEASUREMENTS | |
| | Stature | 3-1 |
| | Weight | 3-2 |
| | Functional Reach (Thumb-Tip Reach) | 3-3 |
| | Maximum Reach | 3-4 |
| | Sitting Height | 3-5 |
| | Eye Height, Seated | 3-6 |
| | Mid-Shoulder Height, Seated | 3-7 |
| | Popliteal Height (Height under Knee, Seated) | 3-8 |
| | Knee Height, Seated | 3-9 |
| | Buttock Popliteal Length (Upper Leg Length, Seated) | 3-10 |
| | Buttock to Knee Length, Seated | 3-11 |
| | Buttock-Leg Length, Seated | 3-12 |
| | Elbow-Fingertip Length | 3-13 |
| | Shoulder to Elbow Length | 3-14 |
| | Elbow Rest Height | 3-15 |
| | Shoulder Breadth (Bideltoid Diameter) | 3-16 |
| | Elbow to Elbow Breadth | 3-17 |
| | Hip Breadth, Seated | 3-18 |
| | Knee to Knee Breadth | 3-19 |
| | Hand Length | 3-20 |
| | Palm Length | 3-21 |
| | Palm Breadth at Knuckle | 3-22 |
| | Foot Length | 3-23 |
| | Instep Length | 3-24 |
| | Foot Breadth | 3-25 |

CONTENTS (contd)

| <u>Section</u> | <u>Page</u> |
|---|-------------|
| Heel Breadth | 3-26 |
| Ankle (Bi-Malleolus) Breadth | 3-27 |
| Grip Diameter, Inside | 3-28 |
| Grip Diameter, Outside | 3-29 |
| Ear Height, Standing (Tragion Height) | 3-30 |
| Cervicale Height | 3-31 |
| Suprasternal Height | 3-32 |
| Nipple Height | 3-33 |
| Waist (Omphalion) Height | 3-34 |
| Gluteal Furrow Height | 3-35 |
| Crotch Height | 3-36 |
| Patella Height, Top | 3-37 |
| Chest Breadth | 3-38 |
| Waist (Omphalion) Breadth | 3-39 |
| Note on Grip Diameter Estimation | 3-40 |

1 - INTRODUCTION

This compilation was undertaken to facilitate the acquisition of international anthropometric data in those dimensions most extensively used by Grumman. Thirty-nine different anthropometric measurements on subjects from twenty-four groups were compiled. In the data section, the group and survey year are followed by values for the third, fifth, fiftieth, ninety-fifth and ninety-eighth percentiles. For each measurement, a description of how the measurement was taken and a pictorial representation of the dimension is given.

For clarification purposes, a population description and survey reference section is included. Arranged in the order that they appear in the data section, the population groups are followed by the reference from which the data appearing in the report was obtained. Also included is a brief description of the composition and number of subjects measured in each survey.

Since not every population was measured in all the dimensions included in this report, some values could not be obtained. These are marked in the data section by a dash (-). Many surveys only included values for certain percentiles. In many cases, values for the percentiles most useful for our purposes had to be calculated from mean and standard deviation values. This calculation was done by standard statistical techniques based on the assumption that the data follow a normal distribution. Although normal distributions were rarely attained, it is the opinion of leading researchers in the field that ~~for~~ most applications, estimates of percentiles derived from this technique can be used with reasonable confidence. ~~for~~ (See Garrett, J. W., et al., A Collation of Anthropometry, AMRL-TR-68-1, 1971, p. 5.)

The technique is summarized as follows:

- 3rd percentile = $\bar{X} - 1.88 \times S.D.$
- 5th percentile = $\bar{X} - 1.65 \times S.D.$
- 50th percentile = \bar{X}
- 95th percentile = $\bar{X} + 1.65 \times S.D.$
- 98th percentile = $\bar{X} + 2.05 \times S.D.$

All values calculated in this manner are indicated by an asterisk (*). All measurements are expressed in inches except for weight, which is in pounds. Any measurement which was not done in the manner previously specified is marked by a dagger and the method of

measurement is given. In addition, some measurements have been estimated by adding or subtracting other dimensions (e.g., tragion height = stature - distance from tragion to top of head). These estimations are also marked.

In summary, it should be kept in mind that, although the data in this report have been compiled from the latest available surveys, population dimensions do change over time. However, the general increase in body dimensions which was observed during the early half of this century has, evidently, been diminishing as of late. (For a numerical example of these changes as reflected in the R.A.F., C.B. Bolton, et al., An Anthropometric Survey of 2000 Royal Air Force Aircrrew, 1970/71, NATO, AGARD - AG-181 1974, p. iii).

2 - POPULATION DESCRIPTIONS AND SURVEY REFERENCES

U.S. NAVY AVIATORS

Gifford, E. C., et al.

Anthropometry of Naval Aviators - 1964. NAEC-ACEL 533,
U. S. Naval Air Engineering Center, Philadelphia, PA., 1965.

Measurements were taken on 1549 men. The sample was composed of Naval (and Marine Corps) Aviation Officers (including navigators, and other permanently designated aeronautical personnel who can expect duties involving flying during their entire careers) and Master, Senior, and Navy and Marine Corps Aviators.

USAF FLYING PERSONNEL

Grunhofer, H.J., and Kroh, G. A Review of Anthropometric Data of German Air Force and United States Air Force Flying Personnel 1967-68.

NATO, AGARD - AG-205, 1975.

The data for USAF flying personnel were taken from measurements of 2420 subjects. These data were supplied by E. Churchill, Director of Anthropology Research Project, Webb Associates, Yellow Springs, Ohio. Rated pilots constituted about half the sample, student pilots and rated navigators both constituted 20% of the sample, while student navigators constituted 8% of the sample.

USAF WOMEN

Clauser, C.E., et al. Anthropometry of Air Force Women.
AMRL-TR-70-5, 1972.

A total of 1905 women were measured in the survey. Thirty percent of these were officers and seventy percent were enlisted women. All of the women were part of the ground crew; of the officers, almost 85% were nurses. The majority of the enlisted women held medical or administrative positions. The median age of the group was 21 years.

U.S. ARMY AVIATORS

Churchill, E., et. al. Anthropometry of U. S. Army Aviators - 1970.
U. S. Army Natick Laboratories, TR 72-52-CE, 1971.

A total of 1482 flying personnel were measured. Aviators include: Master, Senior, and Army Aviators, Trainees, Machinists, Door Gunners, Mechanics, Crew Chiefs, and Instructors. The first four categories mentioned above account for over 80% of the group.

U.S. NAVY ENLISTED

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were made on 4095 Navy enlisted men.

U.S. MARINE ENLISTED

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. NASA Contract NAS9-14720.

Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 2008 U.S. Marines.

U.S. ARMY SOLDIERS

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 6682 Army men which included 2639 trainees, 3429 infantry, 489 armored personnel, and 125 army aviation personnel; of the group, 6110 were enlisted men.

U.S. ADULTS - MEN

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 1012 civilian men between the ages of 25 and 40.

U.S. ADULTS - WOMEN

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 1165 civilian women between the ages of 25 and 40.

FRENCH PILOTS

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 65 pilots in the French Air Force.

GERMAN AF FLYING PERSONNEL

Grunhofer, H.J., and Kroh, G. A Review of Anthropometric Data of German Air Force and USAF Flying Personnel 1967-68. NATO AGARD-AG-205, 1975.

Measurements were taken on more than 1400 subjects by a team from the German Air Force Institute of Aviation Medicine. No breakdown of flying personnel was given.

GREECE AF PILOTS

Hertzberg, H.T., et. al. Anthropometric Survey of Turkey, Greece and Italy. AGARD, NATO, Pergamon Press, New York, 1963.

Air force pilots, flying cadets, and Air Force ground service men composed the largest part of the group of 1084 subjects measured. Army and Navy personnel were also included in the group.

ITALY AF PILOTS

Hertzberg, H.T., et. al. Anthropometric Survey of Turkey, Greece and Italy. AGARD, NATO, Pergamon Press, New York, 1963.

Air Force pilots, flying cadets and Air Force ground service men composed the largest part of the group of 1357 subjects measured. Army and Navy personnel were also included in the group.

IRAN AF TOTAL

Nooranii, S. and Dillard, C.N., Jr. Volume II Anthropometric Survey of the Imperial Iranian Armed Forces, 1970.

Measurements were taken on 790 members of the Iranian Air Force. Of these, 51 (6.5%) were considered flying, with the remainder categorized as non-flying.

ISRAEL AF PILOTS + NAVIGATORS

Haas, A., and Fictor, Y. Anthropometric Survey of Flight Crew. Flight Medics Center, Air Force Command, May, 1977.

Measurements were taken on 133 pilots and navigators in the Israeli Air Force.

JAPAN AF PILOTS

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976. (Based on "Anthropometry of JASDF personnel and Its Application For Human Engineering", Aeromedical Laboratory, 1972).

Measurements were taken on 210 pilots of the Japanese Air Force. Statistics for Air Force navigators were also included. However, the navigator's data are not reported in this compilation because their measurements are nearly identical to the pilots'.

KOREA - ROKAF PILOTS

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 264 South Korean Air Force pilots.

RAF AIRCREW

Bolton, C. B., et. al. An Anthropometric Survey of 2000 Royal Air Force Aircrew, 1970/71. NATO, AGARD-AG-181, 1974.

Measurements were taken on 2000 subjects, including 1028 pilots, 613 navigators, and 359 other flight deck aircrew.

RAAF AIRCREW RATED

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 385 trained personnel in the Royal Australian Air Force.

RCAF PILOTS

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 314 pilots in the Royal Canadian Air Force.

RNZAF FLYING PERSONNEL

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 238 members of the Royal New Zealand Air Force, including 127 pilots, 38 navigators, and 73 other aircrew.

SWEDEN AF FLYING PERSONNEL

Churchill, E., et. al. Anthropometric Source Book, Volume II, A Handbook of Anthropometric Data. Webb Associates, Yellow Springs, Ohio, 1976.

Measurements were taken on 240 Swedish flying personnel.

TURKEY AF PILOTS

Hertzberg, H. T., et. al. Anthropometric Survey of Turkey, Greece and Italy.
AGARD, NATO, Pergamon Press, New York, 1963.

Air Force pilots, flying cadets, and Air Force ground service men composed the largest part of the group of 915 subjects measured. Army and Navy personnel were also included in the group.

U.S. ARMY WOMEN

Churchill, E., et. al. Anthropometry of Women of the U. S. Army - 1977, Report No. 2 - The Basic Univariate Statistics. Technical Report NATICK/TR-77/024, 1977.

Over 1300 women were measured in this survey. Twenty-six percent of the sample were officers. The remaining 74% were enlisted women.

3 - ANTHROPOMETRIC MEASUREMENTS

Dimension Name: STATURE

Subject stands erect looking directly forward (head oriented in the Frankfort plane). With the anthropometer arm touching the scalp, measure the vertical distance from the standing surface to the top of the head.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 65.79 | 66.22 | 69.87 | 73.91 | 74.78 |
| USAF FLYING PERSONNEL | 1967 | 65.29 | 65.85 | 69.78 | 73.90 | 74.89 |
| U.S. AIR FORCE WOMEN | 1968 | 59.55 | 59.99 | 63.77 | 67.77 | 68.79 |
| U.S. ARMY AVIATORS | 1970 | 64.09 | 64.64 | 68.73 | 72.84 | 74.01 |
| U.S. NAVY ENLISTED | 1966 | 64.19* | 64.96 | 68.94 | 73.43 | 74.20* |
| U.S. MARINE CORPS ENLISTED | 1966 | 64.05* | 64.76 | 68.66 | 72.99 | 73.82* |
| U.S. ARMY SOLDIERS | 1966 | 63.82* | 64.49 | 68.66 | 73.07 | 74.04* |
| U.S. ADULTS - MEN | 1960-62 | 63.92* | 64.60 | 69.02 | 73.23 | 74.35* |
| U.S. ADULTS - WOMEN | 1960-62 | 59.01* | 59.57 | 63.74 | 67.68 | 68.71* |
| FRENCH PILOTS | 1973 | 63.81* | 64.32 | 67.98 | 71.64 | 72.53* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 65.22 | 65.74 | 69.58 | 73.72 | 74.60 |
| GREECE AF PILOTS | 1960-61 | 62.87 | 63.35 | 67.13 | 70.98 | 72.01 |
| ITALY AF PILOTS | 1960-61 | 62.56 | 63.07 | 67.20 | 71.14 | 72.24 |
| IRAN AF TOTAL | 1970 | 62.18 | 62.65 | 66.22 | 70.05 | 70.99 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 64.80 | 65.47 | 68.94 | 72.76 | 73.74 |
| JAPAN AF PILOTS | 1972 | 62.10* | 62.87 | 65.79 | 69.25 | 70.02* |
| KOREA - ROKAF PILOTS | 1961 | 63.00* | 62.83 | 65.20 | 68.39 | 70.12* |
| RAF AIRCREW | 1970-71 | 65.17 | 65.68 | 69.69 | 73.70 | 74.88 |
| RAAF AIRCREW RATED | 1973 | 63.24* | 66.22 | 69.92 | 73.58 | 76.54* |
| RCAF PILOTS | (1) | 65.35* | 66.06 | 69.76 | 73.98 | 74.77* |
| RNZAF FLYING PERSONNEL | 1974 | 64.87* | 65.47* | 69.67* | 73.87* | 74.90* |
| SWEDEN AF FLYING PERSONNEL | 1971 | 66.16* | 66.70* | 70.32* | 73.98* | 74.85* |
| TURKEY AF PILOTS | 1960-61 | 62.83 | 63.23 | 66.54 | 70.55 | 71.38 |
| U.S. ARMY WOMEN | 1977 | 59.48 | 60.06 | 64.07 | 68.54 | 69.60 |

(1) No date is shown for this group because the survey data was not dated.

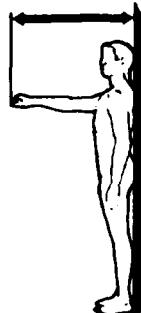
Dimension Name: WEIGHT



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|---------|---------|---------|---------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 136.24 | 140.32 | 171.10 | 203.58 | 213.47 |
| USAF FLYING PERSONNEL | 1967 | 135.82 | 140.15 | 172.42 | 210.75 | 220.94 |
| U.S. AIR FORCE WOMEN | 1968 | 99.77 | 102.29 | 126.08 | 156.38 | 166.90 |
| U.S. ARMY AVIATORS | 1970 | 128.86 | 133.09 | 170.53 | 211.65 | 222.57* |
| U.S. NAVY ENLISTED | 1966 | 114.01* | 125.24 | 154.57 | 201.32 | 205.52* |
| U.S. MARINE CORPS ENLISTED | 1966 | 123.22* | 130.98 | 158.32 | 195.14 | 200.51* |
| U.S. ARMY SOLDIERS | 1966 | 115.21* | 126.35 | 156.33 | 201.98 | 206.98* |
| U.S. ADULTS - MEN | 1960-62 | 116.04* | 127.45 | 166.70 | 218.96 | 226.87* |
| U.S. ADULTS - WOMEN | 1960-62 | 78.43 | 101.43 | 130.32 | 197.13 | 202.01* |
| FRENCH PILOTS | 1973 | 129.60* | 133.62 | 163.83 | 194.70 | 199.78* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 133.51 | 136.80 | 163.78 | 195.41 | 202.68 |
| GREECE AF PILOTS | 1960-61 | 120.17 | 123.04 | 146.41 | 177.50 | 185.66 |
| ITALY AF PILOTS | 1960-61 | 123.92 | 127.01 | 153.47 | 187.43 | 197.79 |
| IRAN AF TOTAL | 1970 | 110.77 | 113.66 | 137.64 | 184.74 | 198.50 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 127.45 | 131.64 | 158.54 | 206.17 | 213.44 |
| JAPAN AF PILOTS | 1972 | 111.33* | 118.63 | 136.27 | 162.51 | 166.88* |
| KOREA - ROKAF PILOTS | 1961 | 111.45* | 117.09 | 136.71 | 168.90 | 168.12* |
| RAF AIRCREW | 1970-71 | 131.08 | 135.38 | 164.15 | 198.45 | 206.97 |
| RAAF AIRCREW RATED | 1973 | 126.43* | 112.46 | 160.97 | 209.48 | 215.68* |
| RCAF PILOTS | | 127.53* | 131.42 | 167.80 | 202.86 | 213.14* |
| RNZAF FLYING PERSONNEL | 1974 | 129.51* | 134.06* | 165.99* | 198.01* | 205.77* |
| SWEDEN AF FLYING PERSONNEL | 1971 | 127.30* | 131.20* | 157.94* | 184.78 | 191.35* |
| TURKEY AF PILOTS | 1960-61 | 112.46 | 115.76 | 140.68 | 174.64 | 185.44 |
| U.S. ARMY WOMEN | 1977 | 99.36 | 102.80 | 131.35 | 164.29 | 175.72 |

Dimension Name: FUNCTIONAL REACH (THUMB TIP REACH)

Subject stands erect, his back against a wall, his right arm extended forward parallel to the floor, the tip of his index finger touching the tip of his extended thumb, the thumb in the plane of the extended arm, and his right shoulder relaxed and touching the wall. Using the anthropometer, measure the horizontal distance from the wall to the tip of the thumb.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|------------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 29.07 | 29.33 | 31.40 | 34.04 | 34.70 |
| USAF FLYING PERSONNEL | 1967 | 28.77 | 29.08 | 31.58 | 34.27 | 35.02 |
| U.S. AIR FORCE WOMEN | 1968 | 26.30 | 26.64 | 29.19 | 31.67 | 32.32 |
| U.S. ARMY AVIATORS | 1970 | 28.47 | 28.77 | 31.12 | 34.15 | 35.03 |
| U.S. NAVY ENLISTED | 1966 | 28.63* | 29.13 | 32.05 | 35.16 | 35.84* |
| U.S. MARINE CORPS ENLISTED | 1966 | 28.08* | 28.62 | 31.57 | 34.88 | 35.49* |
| U.S. ARMY SOLDIERS | 1966 | 28.93* | 29.49 | 32.48 | 35.79 | 36.43* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 28.38 | 28.77 | 31.49 | 34.31 | 35.03 |
| GREECE AF PILOTS | 1960-61 | 27.40 | 27.68 | 29.76 | 32.01 | 32.76 |
| ITALY AF PILOTS | 1960-61 | 27.01 | 27.32 | 29.61 | 32.13 | 32.76 |
| IRAN AF TOTAL | 1970 | 26.97 | 27.31 | 29.66 | 32.24 | 32.81 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 29.06 | 29.53 | 31.73 | 35.35 | 36.18 |
| JAPAN [†] AF PILOTS | 1972 | 26.30 | 26.80 | 28.50 | 30.60 | 31.00 |
| KOREA - ROKAF PILOTS | 1961 | 24.16* | 24.49 | 27.40 | 29.72 | 30.68* |
| RAF AIRCREW | 1970-71 | 28.96 | 29.31 | 31.50 | 33.83 | 34.57 |
| RAAF AIRCREW RATED | 1973 | 29.03* | 28.19 | 31.06 | 33.90 | 34.60* |
| RCAF PILOTS | | 28.80* | 29.37 | 31.57* | 34.37 | 34.77 |
| RNZAF FLYING PERSONNEL | 1974 | 29.06* | 29.45* | 32.10* | 34.76* | 35.41* |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 27.36 | 27.64 | 29.65 | 32.20 | 32.99 |
| US ARMY WOMEN | 1977 | 24.67* | 25.21 | 27.95 | 31.08 | 31.67* |

[†] Estimated Value: obtained by subtracting 3 inches from maximum reach; at best, values are ± 1 inch.

Dimension Name: MAXIMUM REACH

Subject stands erect in a corner looking straight ahead, both shoulders against the back wall, his right arm horizontal and held against the scale, mounted on the side wall. With a block touching the dactylion (tip of middle finger), measure on the wall scale the distance from the back wall to the dactylion.

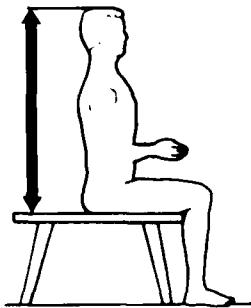


| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | - | - | - | - | - |
| USAF FLYING PERSONNEL | 1967 | - | - | - | - | - |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS | 1970 | - | - | - | - | - |
| U.S. NAVY ENLISTED | 1966 | - | - | - | - | - |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | - | - | - | - | - |
| GREECE AF PILOTS | 1960-61 | - | - | - | - | - |
| ITALY AF PILOTS | 1960-61 | - | - | - | - | - |
| IRAN AF TOTAL | 1970 | 31.08 | 31.43 | 33.58 | 36.03 | 36.68 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 32.76 | 32.83 | 35.08 | 38.46 | 39.29 |
| JAPAN AF PILOTS | 1972 | 29.29* | 29.76 | 31.50 | 33.62 | 34.04* |
| KOREA - ROKAF PILOTS | 1961 | 27.61* | 27.87 | 30.43 | 32.83 | 33.56* |
| RAF AIRCREW † | 1966 | 30.39* | 30.67 | 33.43 | 35.79 | 36.73* |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 30.42* | 30.98 | 33.27 | 36.18 | 36.71* |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | - | - | - | - | - |
| U.S. ARMY WOMEN | 1977 | - | - | - | - | - |

† From Anthropometric Source Book

Dimension Name: SITTING HEIGHT

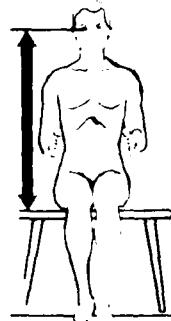
Subject sits erect, his head in the Frankfort Plane, and his feet resting on a surface adjusted so that his knees are bent at about right angles. With the anthropometer arm firmly touching the scalp, measure vertically from the sitting surface to the top of the head.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 33.96 | 34.24 | 36.27 | 38.36 | 38.95 |
| USAF FLYING PERSONNEL | 1967 | 34.44 | 34.70 | 36.65 | 38.80 | 39.31 |
| U.S. AIR FORCE WOMEN | 1968 | 31.41 | 31.66 | 33.68 | 35.79 | 36.30 |
| U.S. ARMY AVIATORS | 1970 | 33.41 | 33.73 | 35.79 | 37.91 | 38.46 |
| U.S. NAVY ENLISTED | 1966 | 33.52* | 33.86 | 36.02 | 38.35 | 38.83* |
| U.S. MARINE CORPS ENLISTED | 1966 | 33.21* | 33.54 | 35.83 | 38.15 | 38.67* |
| U.S. ARMY SOLDIERS | 1966 | 33.00* | 33.35 | 35.75 | 38.07 | 38.66* |
| U.S. ADULTS - MEN | 1960-62 | 33.45* | 33.66 | 36.06 | 38.35 | 38.76* |
| U.S. ADULTS - WOMEN | 1960-62 | 31.26* | 31.46 | 33.82 | 35.98 | 36.37* |
| FRENCH PILOTS | 1973 | 33.65* | 33.91* | 35.79* | 37.67* | 38.13* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 33.30 | 33.58 | 35.79 | 37.96 | 38.43 |
| GREECE AF PILOTS | 1960-61 | 33.35 | 33.62 | 35.51 | 37.48 | 37.91 |
| ITALY AF PILOTS | 1960-61 | 32.83 | 33.15 | 35.31 | 37.32 | 37.83 |
| IRAN AF TOTAL | 1970 | 32.75 | 33.03 | 35.09 | 37.08 | 37.67 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 33.78 | 34.06 | 36.02 | 38.19 | 38.66 |
| JAPAN AF PILOTS | 1972 | 33.81* | 34.17 | 35.94 | 37.76 | 38.27* |
| KOREA - ROKAF PILOTS | 1961 | 33.68* | 33.90 | 35.71 | 37.52 | 38.02* |
| RAF AIRCREW | 1970-71 | 34.19 | 34.54 | 36.59 | 38.60 | 39.08 |
| RAAF AIRCREW RATED | 1973 | 33.58* | 33.62 | 35.98 | 38.35 | 39.09* |
| RCAF PILOTS | | 34.42* | 34.57 | 36.70 | 38.66 | 39.13* |
| RNZAF FLYING PERSONNEL | 1974 | 33.44* | 33.74* | 35.87* | 37.60* | 38.52* |
| SWEDEN AF FLYING PERSONNEL | 1971 | 34.79* | 35.08* | 37.00* | 38.94* | 39.40* |
| TURKEY AF PILOTS | 1960-61 | 33.15 | 33.39 | 35.28 | 37.44 | 37.95 |
| U.S. ARMY WOMEN | 1977 | 30.74 | 31.11 | 33.53 | 35.76 | 36.23 |

Dimension Name: EYE HEIGHT, SEATED

Subject sits erect, his head in the Frankfort plane, his feet resting on a surface adjusted so that the knees are bent at about right angles. Using the anthropometer, measure the vertical distance from the sitting surface to the inner corner of the right eye.

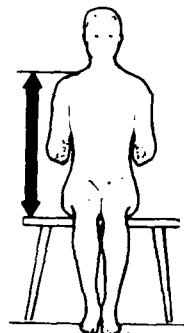


| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 29.41 | 29.70 | 31.52 | 33.61 | 34.16 |
| USAF FLYING PERSONNEL | 1967 | 28.71 | 29.98 | 31.83 | 33.90 | 34.43 |
| U.S. AIR FORCE WOMEN | 1968 | 26.79 | 27.06 | 29.00 | 31.03 | 31.57 |
| U.S. ARMY AVIATORS | 1970 | 28.67 | 28.98 | 31.02 | 33.09 | 33.66 |
| U.S. NAVY ENLISTED | 1966 | 29.10* | 29.45 | 31.42 | 33.54 | 34.01* |
| U.S. MARINE CORPS ENLISTED | 1966 | 28.49* | 28.70 | 31.02 | 33.07 | 33.66* |
| U.S. ARMY SOLDIERS | 1966 | 28.35* | 28.66 | 31.02 | 33.31 | 33.87* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 28.86 | 29.13 | 31.40 | 33.46 | 33.97 |
| GREECE AF PILOTS | 1960-61 | 28.62 | 28.80 | 30.71 | 32.60 | 32.99 |
| ITALY AF PILOTS | 1960-61 | 28.46 | 28.74 | 30.71 | 32.64 | 33.19 |
| IRAN AF TOTAL | 1970 | 28.26 | 28.54 | 30.67 | 32.69 | 33.23 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 29.92 | 30.08 | 32.09 | 34.33 | 35.16 |
| JAPAN AF PILOTS | 1972 | 29.16* | 29.49 | 31.26 | 33.07 | 33.59* |
| KOREA - ROKAF PILOTS | 1961 | 28.83* | 29.13 | 31.10 | 33.35 | 33.74* |
| RAF AIRCREW † | 1970-71 | 30.11 | 30.40 | 32.42 | 34.35 | 34.95 |
| RAAF AIRCREW RATED | 1973 | 29.30* | 29.57 | 31.77 | 33.98 | 34.30* |
| RCAF PILOTS | - | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | 29.24* | 29.57* | 31.72* | 33.90* | 34.43* |
| SWEDEN AF FLYING PERSONNEL | 1971 | 30.30* | 30.59* | 32.66* | 34.72* | 35.24* |
| TURKEY AF PILOTS | 1960-61 | 28.27 | 28.50 | 30.51 | 32.52 | 33.07 |
| U.S. ARMY WOMEN | 1977 | 26.31 | 26.65 | 29.04 | 31.15 | 31.72 |

† Measured from floor to pupil of eye, not corner.

Dimension Name: MID-SHOULDER HEIGHT, SEATED

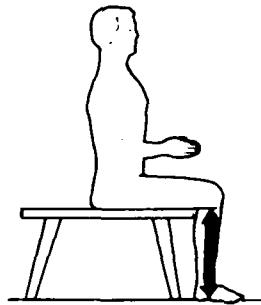
Subject sits erect, his feet resting on a surface adjusted so that the knees are bent at about right angles. Using the anthropometer, measure the vertical distance from the sitting surface to the mid-shoulder landmark.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 21.81 | 22.03 | 23.80 | 25.54 | 26.02 |
| USAF FLYING PERSONNEL | 1967 | - | - | - | - | - |
| U.S. AIR FORCE WOMEN | 1968 | 20.98 | 21.15 | 22.80 | 24.61 | 25.05 |
| U.S. ARMY AVIATORS | 1970 | 22.70 | 22.97 | 24.76 | 26.58 | 27.01 |
| U.S. NAVY ENLISTED | 1966 | 22.46* | 22.76 | 24.69 | 26.70 | 27.12* |
| U.S. MARINE CORPS ENLISTED | 1966 | 22.20* | 22.52 | 24.57 | 26.65 | 27.13* |
| U.S. ARMY SOLDIERS | 1966 | 22.21* | 22.48 | 24.57 | 26.61 | 27.13* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 21.93 | 22.24 | 24.39 | 26.30 | 26.78 |
| GREECE AF PILOTS | 1960-61 | 22.36 | 22.60 | 24.21 | 25.91 | 26.34 |
| ITALY AF PILOTS | 1960-61 | 22.20 | 22.44 | 24.13 | 25.87 | 26.26 |
| IRAN AF TOTAL | 1970 | 22.40 | 22.62 | 24.29 | 26.02 | 26.48 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 22.44 | 22.60 | 24.37 | 25.87 | 26.70 |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KO. EA - ROKAF PILOTS | 1961 | - | - | - | - | - |
| RAF AIRCREW | 1970-71 | 24.19 | 24.46 | 26.20 | 27.90 | 28.31 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | - | 23.28* | 23.46 | 25.28 | 27.09 | 27.44* |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 22.20 | 22.40 | 24.06 | 25.91 | 26.34 |
| U.S. ARMY WOMEN | 1977 | - | - | - | - | - |

Dimension Name: **HEIGHT UNDER KNEE (POPLITEAL HEIGHT),
SEATED**

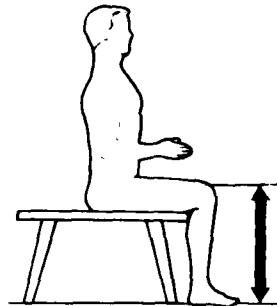
Subject sits erect, his feet resting on a surface adjusted so that the knees are bent at about right angles. Using the anthropometer, measure the vertical distance from the footrest surface to the underside of the right tendon of the biceps femoris muscle where it joins the calf.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 15.74 | 15.93 | 17.29 | 18.78 | 19.09 |
| USAF FLYING PERSONNEL | 1967 | 15.56 | 15.77 | 17.20 | 18.68 | 19.07 |
| U.S. AIR FORCE WOMEN | 1968 | 14.72 | 14.95 | 16.16 | 17.37 | 17.76 |
| U.S. ARMY AVIATORS | 1970 | 14.89 | 15.11 | 16.64 | 18.33 | 18.80 |
| U.S. ENLISTED NAVY | 1966 | 15.36* | 15.55 | 17.24 | 18.82 | 19.26* |
| U.S. MARINE CORPS ENLISTED | 1966 | 16.23* | 16.57 | 17.95 | 19.69 | 19.94* |
| U.S. ARMY SOLDIERS | 1966 | 15.71* | 15.98 | 17.52 | 19.21 | 19.58* |
| U.S. ADULTS - MEN | 1960-62 | 15.57* | 15.71 | 17.64 | 19.37 | 19.64* |
| U.S. ADULTS - WOMEN | 1960-62 | 13.85* | 14.09 | 15.75 | 17.44 | 17.79 |
| FRENCH PILOTS | 1973 | 16.82* | 16.77 | 18.11 | 18.78 | 19.20* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 15.32 | 15.55 | 17.09 | 18.55 | 18.92 |
| GREECE AF PILOTS | 1960-61 | 14.49 | 14.61 | 15.87 | 17.28 | 17.64 |
| ITALY AF PILOTS | 1960-61 | 14.17 | 14.37 | 15.87 | 17.40 | 17.80 |
| IRAN AF TOTAL | 1970 | 14.56 | 14.72 | 15.90 | 17.12 | 17.44 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 16.02 | 16.22 | 17.48 | 18.78 | 19.02 |
| JAPAN AF PILOTS | 1972 | 14.22* | 14.45 | 15.75 | 17.09 | 17.41* |
| KOREA - ROKAF PILOTS | 1961 | 14.72* | 14.84 | 16.10 | 17.20 | 17.53* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | - | 15.57* | 15.98 | 17.09 | 18.66 | 18.87* |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 14.65 | 14.84 | 16.18 | 17.68 | 18.07 |
| U.S. ARMY WOMEN | 1977 | 14.75 | 14.95 | 16.37 | 18.01 | 18.39 |

Dimension Name: KNEE HEIGHT, SEATED

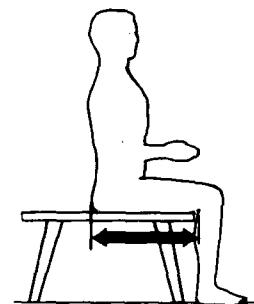
Subject sits erect, his feet resting on a surface adjusted so that the knees are bent at about right angles. Using the anthropometer, measure the vertical distance from the footrest surface to the level of the musculature just above the right knee.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 20.07 | 20.27 | 21.82 | 23.50 | 23.91 |
| USAF FLYING PERSONNEL | 1967 | 20.15 | 20.37 | 21.94 | 23.60 | 24.05 |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS | 1970 | 19.03 | 19.26 | 20.84 | 22.60 | 23.13 |
| U.S. NAVY ENLISTED | 1966 | 19.18* | 19.49 | 21.10 | 22.87 | 23.26* |
| U.S. MARINE CORPS ENLISTED | 1966 | 19.40* | 19.69 | 21.34 | 23.07 | 23.47* |
| U.S. ARMY SOLDIERS | 1966 | 19.26* | 19.57 | 21.26 | 23.11 | 23.49* |
| U.S. ADULTS - MEN | 1960-62 | 19.47* | 19.72 | 21.57 | 23.50 | 23.81 |
| U.S. ADULTS - WOMEN | 1960-62 | 17.66* | 17.91 | 19.72 | 21.50 | 21.87* |
| FRENCH PILOTS | 1973 | 20.43* | 20.67 | 21.81 | 22.87 | 23.33* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 19.16 | 19.46 | 21.27 | 23.03 | 23.47 |
| GREECE AF PILOTS | 1960-61 | 19.09 | 19.25 | 20.51 | 22.44 | 22.83 |
| ITALY AF PILOTS | 1960-61 | 19.13 | 19.33 | 21.02 | 22.76 | 23.19 |
| IRAN AF TOTAL | 1970 | 18.88 | 19.05 | 20.47 | 21.88 | 22.28 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 19.45 | 19.96 | 21.26 | 23.07 | 23.31 |
| JAPAN AF PILOTS | 1972 | 18.07* | 18.35 | 19.53 | 20.87 | 21.17* |
| KOREA - ROKAF PILOTS | 1961 | 18.13* | 18.39 | 19.65 | 20.98 | 21.35* |
| RAF AIRCREW | 1970-71 | 20.23 | 20.41 | 21.95 | 23.70 | 24.24 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 19.96* | 20.28 | 21.70 | 23.66 | 23.92* |
| RNZAF FLYING PERSONNEL | 1974 | 19.58* | 19.80* | 21.46* | 23.15* | 23.57* |
| SWEDEN AF FLYING PERSONNEL | 1971 | 20.08* | 20.31* | 21.81* | 23.31* | 23.69* |
| TURKEY AF PILOTS | 1960-61 | 19.02 | 19.17 | 20.51 | 22.20 | 22.56 |
| U.S. ARMY WOMEN | 1977 | 18.27 | 18.46 | 20.04 | 21.83 | 22.28 |

Dimension Name: **UPPER LEG LENGTH (BUTTOCK-POPLITEAL), SEATED**

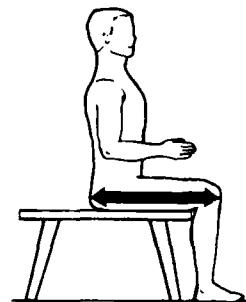
Subject sits erect, his feet resting on a surface adjusted so that the knees are bent at about right angles; the back of the calves should be in contact with the edge of the table. With the wooden block touching the rearmost surface of the buttocks, use the scale on the table surface to measure the horizontal distance from the most posterior protrusion of the right buttock to the back of the calf.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 17.97 | 18.19 | 19.76 | 21.45 | 21.87 |
| USAF FLYING PERSONNEL | 1967 | 17.94 | 18.15 | 19.83 | 21.50 | 21.96 |
| U.S. AIR FORCE WOMEN | 1968 | 16.90 | 17.11 | 18.71 | 20.70 | 21.25 |
| U.S. ARMY AVIATORS | 1970 | 17.48 | 17.66 | 19.32 | 21.03 | 21.42 |
| U.S. NAVY ENLISTED | 1966 | 17.54* | 17.80 | 19.25 | 20.83 | 21.16* |
| U.S. MARINE CORPS ENLISTED | 1966 | 17.85* | 18.15 | 19.69 | 21.46 | 21.78* |
| U.S. ARMY SOLDIERS | 1966 | 17.76* | 18.03 | 19.61 | 21.26 | 21.63* |
| U.S. ADULTS - MEN | 1960-62 | 17.27* | 17.52 | 19.61 | 21.77 | 22.08* |
| U.S. ADULTS - WOMEN | 1960-62 | 16.65* | 16.93 | 18.98 | 21.10 | 21.42 |
| FRENCH PILOTS | 1973 | 17.77* | 18.23 | 19.25 | 20.47 | 20.92* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 17.19 | 17.46 | 19.20 | 20.87 | 21.22 |
| GREECE AF PILOTS | 1960-61 | 16.93 | 17.17 | 18.62 | 20.16 | 20.71 |
| ITALY AF PILOTS | 1960-61 | 17.09 | 17.32 | 18.90 | 20.47 | 20.83 |
| IRAN AF TOTAL | 1970 | 16.42 | 16.64 | 17.99 | 19.47 | 19.84 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 18.07 | 18.19 | 19.41 | 21.22 | 21.61 |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KOREA - ROKAF PILOTS | 1961 | - | - | - | - | - |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 16.81 | 17.05 | 18.66 | 20.35 | 20.87 |
| U.S. ARMY WOMEN | 1977 | - | - | - | - | - |

Dimension Name: BUTTOCK TO KNEE LENGTH, SEATED

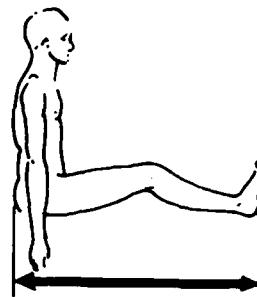
Subject sits erect, his feet resting on a surface adjusted so that the knees are bent at about right angles. Using the anthropometer, measure the horizontal distance from the rearmost surface of the right buttock to the front surface of the kneecap.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 22.26 | 22.50 | 24.06 | 25.80 | 26.24 |
| USAF FLYING PERSONNEL | 1967 | 21.83 | 22.07 | 23.76 | 25.57 | 26.10 |
| U.S. AIR FORCE WOMEN | 1968 | 20.75 | 20.96 | 22.58 | 24.37 | 24.80 |
| U.S. ARMY AVIATORS | 1970 | 21.79 | 22.01 | 23.68 | 25.42 | 25.88 |
| U.S. NAVY ENLISTED | 1966 | 21.28* | 21.57 | 23.31 | 25.12 | 25.52* |
| U.S. MARINE CORPS ENLISTED | 1966 | 21.42* | 21.73 | 23.39 | 25.28 | 25.62* |
| U.S. ARMY SOLDIERS | 1966 | 21.30* | 21.61 | 23.39 | 25.31 | 25.71* |
| U.S. ADULTS - MEN | 1960-62 | 21.36* | 21.54 | 23.54 | 25.51 | 25.80* |
| U.S. ADULTS - WOMEN | 1960-62 | 20.17* | 20.47 | 22.48 | 24.72 | 24.97* |
| FRENCH PILOTS | 1973 | 21.81* | 22.17 | 23.27 | 24.84 | 25.18* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 21.77 | 22.00 | 23.66 | 25.36 | 25.75 |
| GREECE AF PILOTS | 1960-61 | 20.83 | 21.02 | 22.60 | 24.21 | 24.76 |
| ITALY AF PILOTS | 1960-61 | 21.06 | 21.30 | 22.91 | 24.65 | 25.04 |
| IRAN AF TOTAL | 1970 | 20.36 | 20.59 | 22.09 | 23.79 | 24.23 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 21.65 | 22.01 | 23.39 | 25.20 | 26.06 |
| JAPAN AF PILOTS | 1972 | 20.08* | 20.43 | 21.81 | 23.39 | 23.75* |
| KOREA - ROKAF PILOTS | 1961 | 19.59* | 19.72 | 21.18 | 22.60 | 22.94* |
| RAF AIR CREW | 1970-71 | 22.02 | 22.23 | 23.87 | 25.59 | 26.01 |
| RAAF AIR CREW RATED | 1973 | 21.54* | 21.89 | 23.90 | 25.87 | 26.80* |
| RCAF PILOTS | | 21.95* | 22.17 | 23.98 | 25.98 | 26.22* |
| RNZAF FLYING PERSONNEL | 1974 | 22.13* | 22.40* | 24.20* | 26.02* | 26.46* |
| SWEDEN AF FLYING PERSONNEL | 1971 | 22.15* | 22.36* | 23.95* | 25.55* | 25.92* |
| TURKEY AF PILOTS | 1960-61 | 20.83 | 20.98 | 22.40 | 24.06 | 24.49 |
| U.S. ARMY WOMEN | 1977 | 20.64 | 20.90 | 22.71 | 24.89 | 25.41 |

Dimension Name: BUTTOCK-LEG LENGTH, SEATED

Sitting on rig floor, back to end wall. With both legs straight, buttocks pushed back to wall as far as possible. Measurement from end wall to heel block in light contact with left heel, using scale along rig floor.

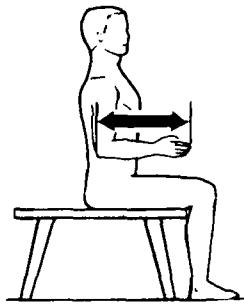


| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | - | - | - | - | - |
| USAF FLYING PERSONNEL | 1967 | - | - | - | - | - |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS † | 1970 | 41.83 | 42.21 | 44.92 | 47.63 | 48.28 |
| U.S. NAVY ENLISTED | 1966 | - | - | - | - | - |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | - | - | - | - | - |
| GREECE AF PILOTS | 1960-61 | - | - | - | - | - |
| ITALY AF PILOTS | 1960-61 | - | - | - | - | - |
| IRAN AF TOTAL | 1970 | - | - | - | - | - |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 37.17 | 37.80 | 40.47 | 43.70 | 44.84 |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KOREA - ROKAF PILOTS | 1961 | - | - | - | - | - |
| RAF AIRCREW | 1970-71 | 40.06 | 40.53 | 43.95 | 47.37 | 48.19 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 40.21* | 40.66 | 43.84 | 47.02 | 47.80* |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | - | - | - | - | - |
| U.S. ARMY WOMEN † | 1977 | 38.59* | 39.21 | 42.83 | 46.71 | 47.55* |

† Subject is seated, leg extended & touching floor. Distance from back of waist to heel.

Dimension Name: ELBOW-FINGERTIP LENGTH

Subject sits erect, upper arms hanging relaxed, forearms and hands extended forward horizontally. With a beam caliper, measure the horizontal distance along the long axis of the forearm and hand from the posterior tip of the olecranon process to dactylion.

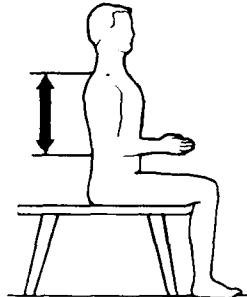


| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|---|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 17.75 | 17.90 | 19.05 | 20.35 | 20.64 |
| USAF FLYING PERSONNEL [†] | 1967 | 17.71 | 17.91 | 19.31 | 20.81 | 21.19 |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS | 1970 | 17.40 | 17.59 | 18.95 | 20.32 | 20.75 |
| U.S. NAVY ENLISTED | 1966 | 17.18* | 17.40 | 18.74 | 20.20 | 20.49* |
| U.S. MARINE CORPS ENLISTED | 1966 | 17.18* | 17.48 | 18.78 | 20.35 | 20.62* |
| U.S. ARMY SOLDIERS | 1966 | 17.17* | 17.44 | 18.86 | 20.43 | 20.75* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL [†] | 1967-68 | 16.66 | 16.91 | 18.62 | 20.21 | 20.63 |
| GREECE AF PILOTS [†] | 1960-61 | 16.86 | 17.05 | 18.29 | 19.70 | 20.05 |
| ITALY AF PILOTS [†] | 1960-61 | 16.84 | 17.04 | 18.40 | 19.89 | 20.26 |
| IRAN AF TOTAL | 1970 | 16.76 | 16.93 | 18.10 | 19.37 | 19.69 |
| ISRAEL AF PILOTS + NAVIG. [†] | 1977 | 16.85 | 17.56 | 18.82 | 20.16 | 20.47 |
| JAPAN AF PILOTS | 1972 | 16.35* | 16.54 | 17.52 | 18.58 | 18.83* |
| KOREA - ROKAF PILOTS | 1961 | 16.02* | 16.34 | 17.40 | 18.66 | 18.94* |
| RAF AIRCREW | 1970-71 | 17.39 | 17.59 | 18.85 | 20.23 | 20.62 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | - | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | 17.39* | 17.56* | 18.91* | 20.24* | 20.56* |
| SWEDEN AF FLYING PERSONNEL | 1971 | 17.49* | 17.68* | 18.92* | 20.20* | 20.49* |
| TURKEY AF PILOTS [†] | 1960-61 | 16.79 | 16.97 | 18.22 | 19.63 | 19.96 |
| U.S. ARMY WOMEN | 1977 | 15.57 | 15.74 | 17.08 | 18.71 | 19.11 |

[†]Measurement obtained by adding elbow-wrist length and hand length.

Dimension Name: SHOULDER TO ELBOW LENGTH

Subject sits erect, his right upper arm hanging at his side and his lower arm extended forward horizontally. Using the anthropometer, measure the vertical distance from the right acromion landmark to the bottom of the elbow.



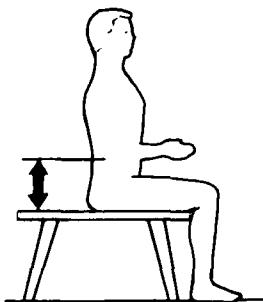
| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 13.26 | 13.41 | 14.49 | 15.61 | 15.91 |
| USAF FLYING PERSONNEL | 1967 | 12.91 | 13.06 | 14.14 | 15.28 | 15.55 |
| U.S. AIR FORCE WOMEN | 1968 | 11.01 | 11.15 | 12.22 | 13.25 | 13.50 |
| U.S. ARMY AVIATORS | 1970 | 13.15 | 13.31 | 14.44 | 15.62 | 15.95 |
| U.S. NAVY ENLISTED | 1966 | 13.16* | 13.35 | 14.53 | 15.71 | 15.99* |
| U.S. MARINE CORPS ENLISTED | 1966 | 13.25* | 13.43 | 14.61 | 15.83 | 16.10* |
| U.S. ARMY SOLDIERS | 1966 | 13.14* | 13.31 | 14.53 | 15.75 | 16.02* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 11.44 | 11.81 | 12.68 | 13.66 | 14.04 |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 12.95 | 13.13 | 14.52 | 15.85 | 16.15 |
| GREECE AF PILOTS | 1960-61 | 12.76 | 12.91 | 13.90 | 14.92 | 15.20 |
| ITALY AF PILOTS | 1960-61 | 12.80 | 12.91 | 14.02 | 15.12 | 15.43 |
| IRAN AF TOTAL | 1970 | 12.86 | 12.98 | 13.93 | 15.04 | 15.32 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 13.70 | 13.90 | 14.96 | 16.18 | 16.46 |
| JAPAN AF PILOTS | 1972 | 11.67 | 12.09 | 13.11 | 14.49 | 14.84 |
| KOREA - ROKAF PILOTS | 1961 | 12.60* | 12.91 | 13.82 | 14.96 | 15.29* |
| RAF AIRCREW | 1970-71 | 14.08 | 14.09 | 14.34 | 14.58 | 14.66 |
| RAAF AIRCREW RATED | 1973 | 14.20* | 14.17 | 14.57 | 14.92 | 14.97* |
| RCAF PILOTS † | | 13.93* | 14.02 | 14.41 | 14.61 | 14.98* |
| RNZAF FLYING PERSONNEL † | 1974 | 14.88* | 14.88* | 15.07* | 15.24* | 15.28* |
| SWEDEN AF FLYING PERSONNEL | 1971 | 13.55* | 13.70* | 14.82* | 15.94* | 16.21* |
| TURKEY AF PILOTS | 1960-61 | 12.64 | 12.80 | 13.82 | 14.92 | 15.16 |
| U.S. ARMY WOMEN | 1977 | 12.00 | 12.14 | 13.18 | 14.39 | 14.67 |

† Measurement obtained by subtracting the Elbow Rest Height from the Acromial Height.

Dimension Name: ELBOW REST HEIGHT

Subject sits erect, his feet resting on a surface adjusted so that his knees are bent at about right angles, his right upper arm hanging at his side and his lower arm extended forward horizontally.

Using the anthropometer, measure the vertical distance from the sitting surface to the bottom of the tip of the right elbow.



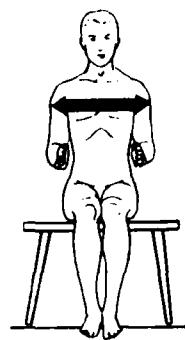
| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 7.42 | 7.64 | 9.25 | 10.90 | 11.37 |
| USAF FLYING PERSONNEL | 1967 | 8.00 | 8.24 | 9.89 | 11.63 | 12.09 |
| U.S. AIR FORCE WOMEN | 1968 | 7.17 | 7.37 | 8.92 | 10.59 | 11.02 |
| U.S. ARMY AVIATORS | 1970 | 7.08 | 7.37 | 9.10 | 10.81 | 11.27 |
| U.S. NAVY ENLISTED | 1966 | 6.74* | 7.05 | 9.33 | 11.61 | 12.12* |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | 7.65* | 7.91 | 9.72 | 11.77 | 11.98* |
| U.S. ADULTS - WOMEN | 1960-62 | 7.24* | 7.44 | 9.33 | 11.18 | 11.50* |
| FRENCH PILOTS | 1973 | 8.48* | 8.66 | 10.24 | 11.34 | 11.81 |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 7.02 | 7.30 | 9.32 | 11.30 | 11.76 |
| GREECE AF PILOTS | 1960-61 | 7.32 | 7.56 | 9.09 | 10.63 | 10.98 |
| ITALY AF PILOTS | 1960-61 | 7.20 | 7.40 | 8.82 | 10.31 | 10.71 |
| IRAN AF TOTAL † | 1970 | 8.43 | 8.54 | 9.31 | 9.97 | 10.14 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 7.44 | 7.72 | 9.61 | 11.18 | 11.81 |
| JAPAN AF PILOTS | 1972 | 8.67* | 8.98 | 10.28 | 11.73 | 12.09* |
| KOREA - ROKAF PILOTS | 1961 | 7.90* | 8.03 | 9.69 | 11.34 | 11.69* |
| RAF AIRCREW | 1970-71 | 7.88 | 8.13 | 9.77 | 11.32 | 11.71 |
| RAAF AIRCREW RATED | 1973 | 6.48* | 6.30 | 8.70 | 11.10 | 12.36* |
| RCAF PILOTS | | 7.93* | 8.07 | 9.69 | 11.06 | 11.58* |
| RNZAF FLYING PERSONNEL | 1974 | 7.10* | 7.36* | 9.11* | 10.87* | 11.29* |
| SWEDEN AF FLYING PERSONNEL | 1971 | 8.00* | 8.23* | 9.72* | 11.22* | 11.59* |
| TURKEY AF PILOTS | 1960-61 | 6.93 | 7.17 | 8.82 | 10.39 | 10.79 |
| U.S. ARMY WOMEN | 1977 | 6.13* | 6.35 | 8.20 | 9.86 | 10.37* |

† Measurement obtained by subtracting the shoulder-elbow length from the acromion height, seated.

Dimension Name: SHOULDER BREADTH (BIDELTOID DIAMETER)

Subject sits erect, his upper arms hanging at his sides, and his lower arms extended forward horizontally.

Using the anthropometer, measure the horizontal distance across the maximum lateral protrusions of the right and left deltoid muscles.

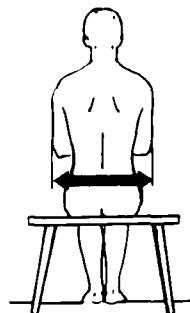


| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 17.05 | 17.28 | 18.78 | 20.26 | 20.64 |
| USAF FLYING PERSONNEL | 1967 | 17.14 | 17.37 | 18.96 | 20.71 | 21.15 |
| U.S. AIR FORCE WOMEN | 1968 | 14.84 | 15.05 | 16.44 | 18.05 | 18.53 |
| U.S. ARMY AVIATORS | 1970 | 16.80 | 17.01 | 18.66 | 20.32 | 20.75 |
| U.S. NAVY ENLISTED | 1966 | 15.79* | 16.10 | 17.64 | 19.45 | 19.76* |
| U.S. MARINE CORPS ENLISTED | 1966 | 16.19* | 16.46 | 17.87 | 19.49 | 19.78* |
| U.S. ARMY SOLDIERS | 1966 | 15.98* | 16.34 | 17.80 | 19.61 | 19.91 |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 17.20* | 17.09 | 18.78 | 19.92 | 20.40* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 16.11 | 16.38 | 18.00 | 19.66 | 20.07 |
| GREECE AF PILOTS | 1960-61 | 16.02 | 16.18 | 17.56 | 19.81 | 19.49 |
| ITALY AF PILOTS | 1960-61 | 16.65 | 16.81 | 18.15 | 19.65 | 20.08 |
| IRAN AF TOTAL | 1970 | 15.43 | 15.62 | 17.11 | 19.15 | 19.65 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 16.57 | 16.77 | 18.27 | 19.92 | 20.35 |
| JAPAN AF PILOTS | 1972 | 16.21* | 16.46 | 17.56 | 18.82 | 19.10* |
| KOREA - ROKAF PILOTS | 1961 | 16.26* | 16.50 | 17.56 | 19.06 | 19.11* |
| RAF AIR CREW | 1970-71 | 16.93 | 17.15 | 18.47 | 19.82 | 20.24 |
| RAAF AIR CREW RATED | 1973 | 16.96* | 16.97 | 18.58 | 20.16 | 20.52* |
| RCAF PILOTS | | 16.29* | 16.50 | 18.07 | 19.76 | 19.97* |
| RNZAF FLYING PERSONNEL | 1974 | 16.80* | 17.01* | 18.43* | 19.84* | 20.21* |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 16.14 | 16.34 | 17.72 | 19.37 | 19.80 |
| U.S. ARMY WOMEN | 1977 | 14.95 | 15.12 | 16.54 | 17.98 | 18.39 |

Dimension Name: ELBOW TO ELBOW BREADTH

Subject sits erect, his upper arms hanging at his side, his lower arms extended forward horizontally, and his elbows resting lightly against his body.

Using the anthropometer, measure the maximum horizontal distance across the lateral surfaces of the elbows.

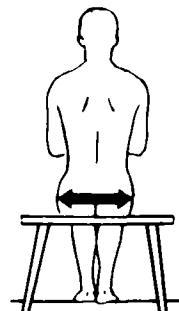


| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|-----------------------------------|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | - | - | - | - | - |
| USAF FLYING PERSONNEL | 1967 | - | - | - | - | - |
| U.S. AIR FORCE WOMEN [†] | 1968 | 12.58 | 12.77 | 14.24 | 16.05 | 16.57 |
| U.S. ARMY AVIATORS | 1970 | - | - | - | - | - |
| U.S. NAVY ENLISTED | 1966 | - | - | - | - | - |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | 13.11* | 13.82 | 16.38 | 19.80 | 20.14* |
| U.S. ADULTS - WOMEN | 1960-62 | 11.09* | 12.24 | 14.57 | 18.78 | 18.98* |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 15.32 | 15.60 | 17.73 | 20.28 | 20.83 |
| GREECE AF PILOTS | 1960-61 | 15.71 | 15.98 | 17.60 | 19.45 | 19.92 |
| ITALY AF PILOTS | 1960-61 | 16.26 | 16.46 | 18.35 | 20.28 | 20.98 |
| IRAN AF TOTAL | 1970 | 14.84 | 15.10 | 17.29 | 20.85 | 21.73 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 15.04 | 15.35 | 17.32 | 20.79 | 21.30 |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KOREA - ROKAF PILOTS | 1961 | 14.27* | 14.80 | 16.26 | 18.39 | 18.61* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 15.63 | 15.83 | 17.56 | 19.76 | 20.51 |
| U.S. ARMY WOMEN | 1977 | - | - | - | - | - |

[†] Measurement obtained by adding the waist breadth to 2 (humeral breadth).

Dimension Name: HIP BREADTH, SEATED

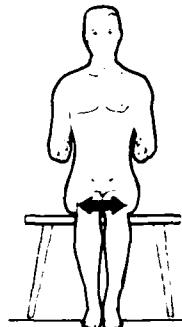
Subject sits erect. Using the anthropometer, measure horizontally across the widest protrusions of the hips.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 12.94 | 13.10 | 14.48 | 15.91 | 16.31 |
| USAF FLYING PERSONNEL | 1967 | 12.54 | 12.71 | 13.86 | 15.15 | 15.55 |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS | 1970 | 12.99 | 13.19 | 14.84 | 16.71 | 17.20 |
| U.S. NAVY ENLISTED | 1966 | 11.58* | 12.01 | 13.23 | 15.04 | 15.23* |
| U.S. MARINE CORPS ENLISTED | 1966 | 11.95* | 12.24 | 13.39 | 14.84 | 15.08* |
| U.S. ARMY SOLDIERS | 1966 | 11.69* | 12.09 | 13.35 | 15.12 | 15.37* |
| U.S. ADULTS - MEN | 1960-62 | 11.92* | 12.20 | 14.02 | 16.06 | 16.26* |
| U.S. ADULTS - WOMEN | 1960-62 | 11.60* | 12.24 | 14.17 | 17.05 | 17.26* |
| FRENCH PILOTS | 1973 | 13.09* | 13.35 | 14.45 | 15.55 | 16.00* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 12.39 | 12.59 | 13.87 | 15.15 | 15.48 |
| GREECE AF PILOTS | 1960-61 | 12.48 | 12.60 | 13.66 | 14.84 | 15.20 |
| ITALY AF PILOTS | 1960-61 | 12.76 | 12.87 | 14.02 | 15.28 | 15.59 |
| IRAN AF TOTAL | 1970 | 11.87 | 12.01 | 13.06 | 14.71 | 15.18 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 12.44 | 12.72 | 13.98 | 16.10 | 16.73 |
| JAPAN AF PILOTS | 1972 | 12.33* | 12.64 | 13.46 | 14.61 | 14.80* |
| KOREA - ROKAF PILOTS | 1961 | 11.65* | 11.77 | 12.95 | 14.21 | 14.36* |
| RAF AIRCREW | 1970-71 | 13.08 | 13.27 | 14.45 | 15.76 | 16.12 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | 12.94* | 13.11* | 14.36* | 15.59* | 15.90* |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 12.09 | 12.24 | 13.39 | 14.61 | 14.96 |
| U.S. ARMY WOMEN | 1977 | - | - | - | - | - |

Dimension Name: KNEE-TO-KNEE BREADTH

Subject sits erect, his feet resting on a surface adjusted so that his knees are bent at about right angles, with the knees touching lightly. Using the anthropometer, measure the maximum horizontal distance across the lateral surfaces of the knees.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|------|------|------|-------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | - | - | - | - | - |
| USAF FLYING PERSONNEL | 1967 | - | - | - | - | - |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS | 1970 | - | - | - | - | - |
| U.S. NAVY ENLISTED | 1966 | - | - | - | - | - |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 7.19 | 7.28 | 8.03 | 8.90 | 9.18 |
| GREECE AF PILOTS | 1960-61 | 7.36 | 7.44 | 8.15 | 9.02 | 9.29 |
| ITALY AF PILOTS | 1960-61 | 7.32 | 7.40 | 8.15 | 8.98 | 9.29 |
| IRAN AF TOTAL | 1970 | - | - | - | - | - |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 7.28 | 7.40 | 8.07 | 9.37 | 9.72 |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KOREA - ROKAF PILOTS | 1961 | 6.63* | 6.93 | 7.76 | 8.78 | 9.03* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 7.24 | 7.36 | 8.03 | 9.02 | 9.37 |
| U.S. ARMY WOMEN | 1977 | - | - | - | - | - |

Dimension Name: HAND LENGTH

Subject's right hand is extended stiffly in the axis of the lower arm, palm upward and fingers together. With the bar of the sliding caliper parallel to the long axis of the hand, measure the distance from the landmark at the base of the hand to the tip of the middle finger.

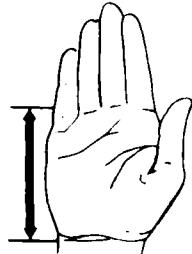


| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|-------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 6.92 | 6.98 | 7.52 | 8.09 | 8.23 |
| USAF FLYING PERSONNEL | 1967 | 6.93 | 7.00 | 7.51 | 8.07 | 8.21 |
| U.S. AIR FORCE WOMEN | 1968 | 6.58 | 6.65 | 7.22 | 7.89 | 8.06 |
| U.S. ARMY AVIATORS | 1970 | 6.91 | 7.00 | 7.56 | 8.14 | 8.32 |
| U.S. NAVY ENLISTED | 1966 | 6.77* | 6.85 | 7.44 | 8.03 | 8.17* |
| U.S. MARINE CORPS ENLISTED | 1966 | 6.77* | 6.89 | 7.44 | 8.11 | 8.21* |
| U.S. ARMY SOLDIERS | 1966 | 6.78* | 6.89 | 7.48 | 8.15 | 8.27* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 6.99* | 6.97 | 7.60 | 8.03 | 8.18* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 6.80 | 6.88 | 7.45 | 8.01 | 8.16 |
| GREECE AF PILOTS | 1960-61 | 6.82 | 6.89 | 7.38 | 7.96 | 8.12 |
| ITALY AF PILOTS | 1960-61 | 6.84 | 6.92 | 7.45 | 8.04 | 8.17 |
| IRAN AF TOTAL | 1970 | 6.78 | 6.84 | 7.34 | 7.91 | 8.06 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 6.97 | 7.05 | 7.52 | 8.03 | 8.11 |
| JAPAN AF PILOTS † | 1972 | 6.54* | 6.61 | 7.24 | 7.80 | 7.98* |
| KOREA - ROKAF PILOTS | 1961 | 6.69* | 6.65 | 7.13 | 7.64 | 7.89* |
| RAF AIRCREW | 1970-71 | 6.80 | 6.88 | 7.51 | 8.14 | 8.34 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 6.78* | 6.89 | 7.52 | 7.99 | 8.24* |
| RNZAF FLYING PERSONNEL | 1974 | 7.43* | 7.52* | 8.25* | 8.98* | 9.14* |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 6.83 | 6.89 | 7.40 | 7.98 | 8.11 |
| U.S. ARMY WOMEN | 1977 | 6.25 | 6.32 | 6.84 | 7.50 | 7.65 |

† Palm length + length of middle finger. (from Anthropometry of JASDF Personnel and its Application for Human Engineering. Aeromedical Laboratory, 1972.)

Dimension Name: PALM LENGTH

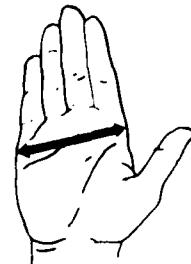
Subject's right hand is extended stiffly in the axis of the lower arm, palm upward and fingers together. With the bar of the sliding caliper parallel to the long axis of the hand, measure the distance from the landmark at the base of the hand to the skin furrow formed where the middle finger folds upon the palm.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|------|------|------|-------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | - | - | - | - | - |
| USAF FLYING PERSONNEL | 1967 | 3.88 | 3.92 | 4.26 | 4.63 | 4.70 |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS | 1970 | 3.93 | 3.97 | 4.30 | 4.69 | 4.79 |
| U.S. NAVY ENLISTED | 1966 | 3.65* | 3.70 | 4.09 | 4.45 | 4.54* |
| U.S. MARINE CORPS ENLISTED | 1966 | 3.71* | 3.78 | 4.13 | 4.57 | 4.76* |
| U.S. ARMY SOLDIERS | 1966 | 3.70* | 3.78 | 4.17 | 4.61 | 4.68* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 3.69 | 3.75 | 4.15 | 4.56 | 4.66 |
| GREECE AF PILOTS | 1960-61 | 3.78 | 3.83 | 4.13 | 4.52 | 4.60 |
| ITALY AF PILOTS | 1960-61 | 3.83 | 3.89 | 4.22 | 4.58 | 4.68 |
| IRAN AF TOTAL | 1970 | 3.77 | 3.81 | 4.11 | 4.47 | 4.58 |
| ISRAELL AF PILOTS + NAVIG. | 1977 | 3.90 | 3.94 | 4.29 | 4.61 | 4.72 |
| JAPAN AF PILOTS | 1972 | 3.79* | 3.82 | 4.17 | 4.49 | 4.58* |
| KOREA - ROKAF PILOTS | 1961 | 3.62* | 3.70 | 4.06 | 4.41 | 4.49* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 3.85 | 3.89 | 4.21 | 4.56 | 4.64 |
| U.S. ARMY WOMEN | 1977 | 3.52 | 3.56 | 3.88 | 4.24 | 4.33 |

Dimension Name: PALM BREADTH AT KNUCKLE

Subject's right hand is held stiffly, palm upward, the fingers extended and together. The thumb is held away from the hand. Using the sliding caliper, measure the distance across the distal ends of the metacarpal bones.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|------|------|------|-------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 3.21 | 3.25 | 3.53 | 3.80 | 3.87 |
| USAF FLYING PERSONNEL | 1967 | 3.21 | 3.24 | 3.50 | 3.78 | 3.86 |
| U.S. AIR FORCE WOMEN | 1968 | 2.69 | 2.72 | 2.97 | 3.23 | 3.30 |
| U.S. ARMY AVIATORS | 1970 | 3.18 | 3.22 | 3.48 | 3.76 | 3.83 |
| U.S. NAVY ENLISTED | 1966 | 3.10* | 3.19 | 3.50 | 3.94 | 4.00* |
| U.S. MARINE CORPS ENLISTED | 1966 | 3.16* | 3.23 | 3.50 | 3.78 | 3.84* |
| U.S. ARMY SOLDIERS | 1966 | 3.14* | 3.19 | 3.50 | 3.82 | 3.90* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 3.12* | 3.19 | 3.43 | 3.70 | 3.76* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 3.07 | 3.11 | 3.37 | 3.67 | 3.74 |
| GREECE AF PILOTS | 1960-61 | 3.17 | 3.20 | 3.45 | 3.73 | 3.80 |
| ITALY AF PILOTS | 1960-61 | 3.18 | 3.22 | 3.50 | 3.79 | 3.86 |
| IRAN AF TOTAL | 1970 | 3.13 | 3.17 | 3.42 | 3.70 | 3.77 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 3.19 | 3.23 | 3.46 | 3.70 | 3.74 |
| JAPAN AF PILOTS | 1972 | 3.05* | 3.11 | 3.35 | 3.54 | 3.64* |
| KOREA - ROKAF PILOTS | 1961 | 3.02* | 3.07 | 3.31 | 3.54 | 3.59* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 3.01* | 3.07 | 3.39 | 3.66 | 3.78* |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 3.09 | 3.14 | 3.40 | 3.69 | 3.76 |
| U.S. ARMY WOMEN | 1977 | 2.80 | 2.83 | 3.08 | 3.33 | 3.39 |

Dimension Name: FOOT LENGTH

Subject stands with his right foot in the foot box, the foot just touching the side and rear walls, its long axis parallel to the side wall, and his weight equally distributed on both feet. With the block touching the tip of the longest toe, measure foot length from the rear wall, using the scale on the floor of the box.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 9.64 | 9.73 | 10.46 | 11.29 | 11.49 |
| USAF FLYING PERSONNEL | 1967 | 9.79 | 9.89 | 10.63 | 11.43 | 11.64 |
| U.S. AIR FORCE WOMEN | 1968 | 8.64 | 8.74 | 9.47 | 10.23 | 10.43 |
| U.S. ARMY AVIATORS | 1970 | 9.50 | 9.62 | 10.42 | 11.25 | 11.45 |
| U.S. NAVY ENLISTED | 1966 | 9.48* | 9.61 | 10.43 | 11.30 | 11.48* |
| U.S. MARINE CORPS ENLISTED | 1966 | 9.56* | 9.69 | 10.51 | 11.38 | 11.55* |
| U.S. ARMY SOLDIERS | 1966 | 9.58* | 9.72 | 10.51 | 11.42 | 11.59* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 9.63* | 9.72 | 10.51 | 11.22 | 11.34* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 9.49 | 9.60 | 10.37 | 11.19 | 11.38 |
| GREECE AF PILOTS | 1960-61 | 9.52 | 9.62 | 10.34 | 11.13 | 11.36 |
| ITALY AF PILOTS | 1960-61 | 9.59 | 9.69 | 10.41 | 11.17 | 11.40 |
| IRAN AF TOTAL | 1970 | 9.42 | 9.53 | 10.28 | 11.05 | 11.27 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 9.29 | 9.33 | 10.08 | 10.94 | 11.18 |
| JAPAN AF PILOTS | 1972 | 9.06* | 9.17 | 9.72 | 10.31 | 10.47* |
| KOREA - ROKAF PILOTS | 1961 | 9.03* | 9.13 | 9.72 | 10.39 | 10.53* |
| RAF AIRCREW | 1970-71 | 9.61 | 9.72 | 10.43 | 11.24 | 11.46 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 9.68* | 9.76 | 10.47 | 11.38 | 11.52* |
| RNZAF FLYING PERSONNEL | 1974 | 9.42* | 9.53* | 10.35* | 11.18* | 11.37* |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 9.53 | 9.63 | 10.31 | 11.04 | 11.24 |
| U.S. ARMY WOMEN | 1977 | 8.69 | 8.80 | 9.55 | 10.42 | 10.65 |

Dimension Name: INSTEP LENGTH

Subject stands with his right foot in the foot box, the foot just touching the side and rear walls, its long axis parallel to the side wall, and his weight equally distributed on both feet. With the edge of the block touching the wider part of the foot, measure instep length from the rear wall, using the scale on the floor of the box.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|------|------|------|-------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | - | - | - | - | - |
| USAF FLYING PERSONNEL | 1967 | 7.09 | 7.18 | 7.78 | 8.42 | 8.59 |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS | 1970 | 6.79 | 6.83 | 7.54 | 8.23 | 8.40 |
| U.S. NAVY ENLISTED | 1966 | 6.85* | 6.97 | 7.64 | 8.31 | 8.46* |
| U.S. MARINE CORPS ENLISTED | 1966 | 6.92* | 7.05 | 7.72 | 8.43 | 8.56* |
| U.S. ARMY SOLDIERS | 1966 | 6.96* | 7.05 | 7.72 | 8.43 | 8.58* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 7.02* | 7.17 | 7.56 | 8.11 | 8.18* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 6.98 | 7.10 | 7.82 | 8.59 | 8.81 |
| GREECE AF PILOTS | 1960-61 | 6.88 | 6.97 | 7.54 | 8.09 | 8.28 |
| ITALY AF PILOTS | 1960-61 | 6.88 | 6.96 | 7.50 | 8.06 | 8.22 |
| IRAN AF TOTAL | 1970 | 6.53 | 6.65 | 7.27 | 7.84 | 8.00 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 6.46 | 6.54 | 7.17 | 7.83 | 7.95 |
| JAPAN AF PILOTS | 1972 | 6.66* | 6.73 | 7.20 | 7.68 | 7.79* |
| KOREA - ROKAF PILOTS | 1961 | 6.56* | 6.69 | 7.17 | 7.64 | 7.90* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | - | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 6.88 | 6.94 | 7.48 | 8.05 | 8.21 |
| U.S. ARMY WOMEN | 1977 | 6.33 | 6.41 | 7.02 | 7.70 | 7.89 |

Dimension Name: FOOT BREADTH

Subject stands with his right foot in the foot box, the foot just touching the side and rear walls, its long axis parallel to the side wall, and his weight equally distributed on both feet. With the block touching the widest part of the foot, measure foot width from the side wall, using the scale on the floor of the box.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|-------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 3.53 | 3.58 | 4.00 | 4.58 | 4.74 |
| USAF FLYING PERSONNEL | 1967 | 3.50 | 3.54 | 3.84 | 4.18 | 4.27 |
| U.S. AIR FORCE WOMEN | 1968 | 3.11 | 3.16 | 3.48 | 3.84 | 3.95 |
| U.S. ARMY AVIATORS | 1970 | 3.51 | 3.56 | 3.92 | 4.33 | 4.44 |
| U.S. NAVY ENLISTED | 1966 | 3.45* | 3.50 | 3.82 | 4.21 | 4.27* |
| U.S. MARINE CORPS ENLISTED | 1966 | 3.47* | 3.54 | 3.86 | 4.21 | 4.28* |
| U.S. ARMY SOLDIERS | 1966 | 3.47* | 3.54 | 3.56 | 4.25 | 4.32* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 3.69* | 3.74 | 4.06 | 4.45 | 4.48 |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 3.39 | 3.47 | 3.93 | 4.31 | 4.41 |
| GREECE AF PILOTS | 1960-61 | 3.61 | 3.66 | 3.98 | 4.33 | 4.40 |
| ITALY AF PILOTS | 1960-61 | 3.64 | 3.69 | 4.02 | 4.36 | 4.46 |
| IRAN AF TOTAL | 1970 | 3.68 | 3.74 | 4.05 | 4.48 | 4.55 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 3.50 | 3.54 | 3.86 | 4.25 | 4.37 |
| JAPAN AF PILOTS | 1972 | 3.75* | 3.86 | 4.13 | 4.41 | 4.48* |
| KOREA - ROKAF PILOTS | 1961 | 3.40* | 3.54 | 3.82 | 4.09 | 4.11* |
| RAF AIRCREW | 1970-71 | 3.43 | 3.46 | 3.73 | 4.03 | 4.11 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 3.71 | 3.66 | 4.09 | 4.49 | 4.53* |
| RNZAF FLYING PERSONNEL | 1974 | 3.44* | 3.50* | 3.87* | 4.25* | 4.34* |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 3.59 | 3.64 | 3.99 | 4.38 | 4.48 |
| U.S. ARMY WOMEN | 1977 | 3.12 | 3.17 | 3.49 | 3.83 | 3.93 |

Dimension Name: HEEL BREADTH

The Maximum breadth of the heel is measured behind the projections of the ankle bones.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|-------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | - | - | - | - | - |
| USAF FLYING PERSONNEL | 1967 | - | - | - | - | - |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS † | 1970 | 1.51 | 1.55 | 1.79 | 2.05 | 2.13 |
| U.S. NAVY ENLISTED | 1966 | 2.33* | 2.36* | 2.64* | 2.95* | 2.99* |
| U.S. MARINE CORPS ENLISTED | 1966 | 2.36* | 2.44* | 2.68* | 2.99* | 3.04* |
| U.S. ARMY SOLDIERS | 1966 | 2.35* | 2.44* | 2.68* | 3.03* | 3.08* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 2.49* | 2.52 | 2.76 | 2.99 | 3.04* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | - | - | - | - | - |
| GREECE AF PILOTS | 1960-61 | - | - | - | - | - |
| ITALY AF PILOTS | 1960-61 | - | - | - | - | - |
| IRAN AF TOTAL | 1970 | 2.38 | 2.41 | 2.66 | 2.88 | 2.96 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | - | - | - | - | - |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KOREA - ROKAF PILOTS | 1961 | 2.20* | 2.24 | 2.48 | 2.68 | 2.78* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | - | - | - | - | - |
| U.S. ARMY WOMEN | 1977 | 2.12 | 2.15 | 2.38 | 2.69 | 2.77 |

† Maximum horizontal breadth of the right calcaneus.

Dimension Name: ANKLE BREADTH (Bi - MALLEOLUS)

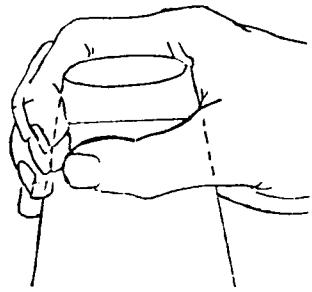
Subject stands, legs slightly apart, weight distributed equally on both feet. Holding the anthropometer shaft perpendicular to the long axis of the foot, measure horizontally across the maximum protrusions of the medial and lateral ankle bones of the right foot.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|------|------|------|-------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | - | - | - | - | - |
| USAF FLYING PERSONNEL | 1967 | 2.62 | 2.65 | 2.88 | 3.14 | 3.21 |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS | 1970 | - | - | - | - | - |
| U.S. NAVY ENLISTED | 1966 | - | - | - | - | - |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 2.62* | 2.68 | 2.91 | 3.23 | 3.26* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 2.70 | 2.73 | 3.03 | 3.32 | 3.42 |
| GREECE AF PILOTS | 1960-61 | 2.67 | 2.70 | 2.94 | 3.19 | 3.26 |
| ITALY AF PILOTS | 1960-61 | 2.65 | 2.69 | 2.94 | 3.21 | 3.28 |
| IRAN AF TOTAL | 1970 | - | - | - | - | - |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 2.56 | 2.60 | 2.83 | 3.15 | 3.19 |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KOREA - ROKAF PILOTS | 1961 | 2.64* | 2.68 | 2.95 | 3.15 | 3.27* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 2.67 | 2.70 | 2.97 | 3.26 | 3.34 |
| U.S. ARMY WOMEN | 1977 | - | - | - | - | - |

Dimension Name: GRIP DIAMETER, INSIDE[†]

The diameter of the widest level of a cone which the subject can grasp with his thumb and middle finger touching.

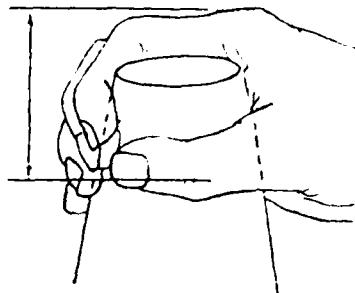


| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|------|------|------|------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 1.71 | 1.76 | 1.93 | 2.14 | 2.16 |
| USAF FLYING PERSONNEL | 1967 | 1.71 | 1.76 | 1.93 | 2.14 | 2.16 |
| U.S. AIR FORCE WOMEN | 1968 | 1.63 | 1.68 | 1.86 | 2.09 | 2.12 |
| U.S. ARMY AVIATORS | 1970 | 1.71 | 1.76 | 1.94 | 2.16 | 2.19 |
| U.S. NAVY ENLISTED | 1966 | 1.67 | 1.73 | 1.91 | 2.13 | 2.15 |
| U.S. MARINE CORPS ENLISTED | 1966 | 1.67 | 1.74 | 1.91 | 2.15 | 2.16 |
| U.S. ARMY SOLDIERS | 1966 | 1.67 | 1.74 | 1.92 | 2.16 | 2.18 |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 1.73 | 1.76 | 1.95 | 2.13 | 2.15 |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 1.68 | 1.76 | 1.91 | 2.12 | 2.15 |
| GREECE AF PILOTS | 1960-61 | 1.68 | 1.74 | 1.90 | 2.11 | 2.13 |
| ITALY AF PILOTS | 1960-61 | 1.69 | 1.74 | 1.91 | 2.13 | 2.15 |
| IRAN AF TOTAL | 1970 | 1.67 | 1.72 | 1.89 | 2.10 | 2.12 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 1.72 | 1.78 | 1.93 | 2.13 | 2.13 |
| JAPAN AF PILOTS | 1972 | 1.59 | 1.61 | 1.81 | 2.05 | 2.09 |
| KOREA - ROKAF PILOTS | 1961 | 1.68 | 1.73 | 1.89 | 2.05 | 2.08 |
| RAF AIRCREW | 1970-71 | 1.68 | 1.76 | 1.93 | 2.16 | 2.19 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 1.67 | 1.76 | 1.93 | 2.12 | 2.16 |
| RNZAF FLYING PERSONNEL | 1974 | 1.84 | 1.90 | 2.12 | 2.38 | 2.40 |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 1.69 | 1.74 | 1.90 | 2.11 | 2.13 |
| U.S. ARMY WOMEN | 1977 | - | - | - | - | - |

[†] All values are estimated except KOREAN PILOTS & JAPANESE PILOTS. Refer to page 3-40.

Dimension Name: GRIP DIAMETER, OUTSIDE [†]

The distance between the first and second phalanges of the thumb and the knuckle of the middle finger measured with the hand held as for grip diameter, inside.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|------|------|------|------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 3.60 | 3.71 | 3.76 | 4.37 | 4.42 |
| USAF FLYING PERSONNEL | 1967 | 3.60 | 3.72 | 3.76 | 4.36 | 4.41 |
| U.S. AIR FORCE WOMEN | 1968 | 3.42 | 3.54 | 3.61 | 4.26 | 4.33 |
| U.S. ARMY AVIATORS | 1970 | 3.59 | 3.72 | 3.78 | 4.40 | 4.47 |
| U.S. NAVY ENLISTED | 1966 | 3.52 | 3.64 | 3.72 | 4.34 | 4.39 |
| U.S. MARINE CORPS ENLISTED | 1966 | 3.52 | 3.67 | 3.72 | 4.38 | 4.41 |
| U.S. ARMY SOLDIERS | 1966 | 3.53 | 3.67 | 3.74 | 4.40 | 4.44 |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 3.63 | 3.71 | 3.73 | 4.34 | 4.39 |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 3.54 | 3.66 | 3.73 | 4.33 | 4.38 |
| GREECE AF PILOTS | 1960-61 | 3.55 | 3.67 | 3.69 | 4.30 | 4.36 |
| ITALY AF PILOTS | 1960-61 | 3.55 | 3.68 | 3.73 | 4.34 | 4.38 |
| IRAN AF TOTAL | 1970 | 3.53 | 3.64 | 3.67 | 4.27 | 4.33 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 3.62 | 3.75 | 3.76 | 4.34 | 4.36 |
| JAPAN AF PILOTS | 1972 | 3.40 | 3.52 | 3.62 | 4.21 | 4.29 |
| KOREA - ROKAF PILOTS | 1961 | 3.48 | 3.54 | 3.56 | 4.13 | 4.24 |
| RAF AIRCREW | 1970-71 | 3.54 | 3.66 | 3.76 | 4.40 | 4.48 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 3.53 | 3.66 | 3.76 | 4.33 | 4.42 |
| RNZAF FLYING PERSONNEL | 1974 | 3.86 | 4.00 | 4.13 | 4.85 | 4.91 |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 3.55 | 3.67 | 3.70 | 4.31 | 4.36 |
| U.S. ARMY WOMEN | 1977 | - | - | - | - | - |

[†]All values are estimated except KOREA - ROKAF pilots. Refer to page 3-40.

Dimension Name: EAR HEIGHT, STANDING (TRAGION HEIGHT)

The height of the tragion.



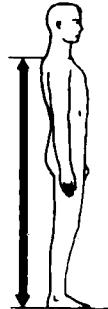
| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|---|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 60.82 | 61.25 | 64.84 | 68.75 | 69.62 |
| USAF FLYING PERSONNEL [†] | 1967 | 60.46 | 60.96 | 64.48 | 68.21 | 69.10 |
| U.S. AIR FORCE WOMEN [†] | 1968 | 55.06 | 55.44 | 58.78 | 62.23 | 63.11 |
| U.S. ARMY AVIATORS [†] | 1970 | 59.28 | 59.76 | 63.49 | 67.25 | 68.32 |
| U.S. NAVY ENLISTED [†] | 1966 | 59.49 | 60.20 | 63.59 | 67.56 | 68.18* |
| U.S. MARINE CORPS ENLISTED [†] | 1966 | 59.29 | 63.38 | 67.28 | 68.00 | 68.00* |
| U.S. ARMY SOLDIERS [†] | 1966 | 59.20* | 59.80 | 63.46 | 67.36 | 68.19* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 60.56* | 61.06 | 64.13 | 67.52 | 68.36* |
| GERMAN AF FLYING PERSONNEL [†] | 1967-68 | 60.88 | 61.27 | 64.48 | 68.02 | 68.76 |
| GREECE AF PILOTS [†] | 1960-61 | 57.98 | 58.41 | 61.82 | 65.33 | 66.27 |
| ITALY AF PILOTS [†] | 1960-61 | 57.86 | 58.32 | 62.09 | 65.68 | 66.69 |
| IRAN AF TOTAL | 1970 | 57.74 | 58.05 | 61.00 | 64.42 | 65.25 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 60.27 | 60.82 | 63.74 | 67.09 | 68.03 |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KOREA - ROKAF PILOTS | 1961 | 57.77* | 57.91 | 61.22 | 63.62 | 64.97* |
| RAF AIRCREW [†] | 1970-71 | 60.52 | 60.97 | 64.58 | 68.26 | 69.28 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | 61.57 | 64.56 | 68.19 | 68.84* |
| RNZAF FLYING PERSONNEL | 1974 | 60.20* | 60.75* | 64.45* | 68.16* | 69.09* |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS [†] | 1960-61 | 58.05 | 58.41 | 61.37 | 64.99 | 65.73 |
| U.S. ARMY WOMEN [†] | 1977 | 54.78 | 55.29 | 58.88 | 62.92 | 63.88* |

[†] Measurement is stature minus the tragion to top of head length.

Dimension Name: CERVICALE HEIGHT

Subject stands erect, his head in the Frankfort plane.

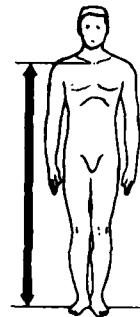
Using the anthropometer, measure the vertical distance from the standing surface to the cervicale landmark indicating the protrusion of the spinous process of the 7th cervical vertebra.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 55.64 | 56.05 | 59.42 | 63.26 | 64.11 |
| USAF FLYING PERSONNEL | 1967 | 55.53 | 56.10 | 59.84 | 63.70 | 64.70 |
| U.S. AIR FORCE WOMEN | 1968 | 50.89 | 51.30 | 54.75 | 58.43 | 59.37 |
| U.S. ARMY AVIATORS | 1970 | 54.53 | 55.03 | 58.93 | 62.80 | 63.89 |
| U.S. NAVY ENLISTED | 1966 | 54.23* | 54.96 | 58.86 | 63.15 | 64.01* |
| U.S. MARINE CORPS ENLISTED | 1966 | 54.38* | 55.08 | 58.82 | 62.99 | 63.82* |
| U.S. ARMY SOLDIERS | 1966 | 54.19* | 54.84 | 58.86 | 63.07 | 64.00* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 55.23 | 55.72 | 59.38 | 63.27 | 64.18 |
| GREECE AF PILOTS | 1960-61 | 52.91 | 53.43 | 56.81 | 60.55 | 61.50 |
| ITALY AF PILOTS | 1960-61 | 52.83 | 53.39 | 57.40 | 61.22 | 62.28 |
| IRAN AF TOTAL | 1970 | 52.71 | 53.15 | 56.54 | 60.20 | 61.05 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 54.57 | 55.08 | 58.11 | 62.28 | 62.99 |
| JAPAN AF PILOTS | 1972 | 52.15* | 52.87 | 55.59 | 59.02 | 59.61* |
| KOREA - ROKAF PILOTS | 1961 | 52.65* | 52.87 | 56.02 | 58.74 | 59.60* |
| RAF AIRCREW | 1970-71 | 55.51 | 55.92 | 59.72 | 63.54 | 64.56 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 55.50* | 56.18 | 59.49 | 63.39 | 64.13* |
| RNZAF FLYING PERSONNEL | 1974 | 54.93* | 55.47* | 59.39* | 63.31* | 64.26* |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 52.87 | 53.27 | 56.46 | 60.31 | 61.26 |
| U.S. ARMY WOMEN | 1977 | 50.67* | 51.17 | 55.32 | 58.97 | 60.09* |

Dimension Name: SUPRASTERNAL HEIGHT

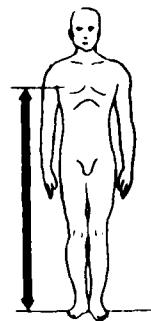
Subject stands erect. Using the anthropometer, measure the vertical distance from the standing surface to the suprasternal landmark.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 53.44 | 53.82 | 57.14 | 60.75 | 61.52 |
| USAF FLYING PERSONNEL | 1967 | 53.15 | 53.65 | 57.12 | 60.82 | 61.71 |
| U.S. AIR FORCE WOMEN | 1968 | 48.18 | 48.59 | 51.92 | 55.48 | 56.38 |
| U.S. ARMY AVIATORS | 1970 | - | - | - | - | - |
| U.S. NAVY ENLISTED | 1966 | - | - | - | - | - |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 53.23* | 53.78 | 56.42 | 59.96 | 60.40* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 52.92 | 53.43 | 56.75 | 60.36 | 61.14 |
| GREECE AF PILOTS | 1960-61 | 50.43 | 51.02 | 54.37 | 57.91 | 58.94 |
| ITALY AF PILOTS | 1960-61 | 50.39 | 50.83 | 54.49 | 58.11 | 59.09 |
| IRAN AF TOTAL | 1970 | - | - | - | - | - |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 52.44 | 53.03 | 55.59 | 59.57 | 60.00 |
| JAPAN AF PILOTS | 1972 | 49.95* | 50.55 | 53.15 | 56.14 | 56.80* |
| KOREA - ROKAF PILOTS | 1961 | 50.63* | 51.06 | 53.98 | 56.57 | 57.50* |
| RAF AIRCREW | 1966 | 52.64 | 52.91 | 56.65 | 59.92 | 60.94* |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 50.63 | 50.94 | 53.98 | 57.44 | 58.23 |
| U.S. ARMY WOMEN | 1977 | 48.04* | 48.57 | 52.22 | 55.89 | 56.76* |

Dimension Name: NIPPLE HEIGHT

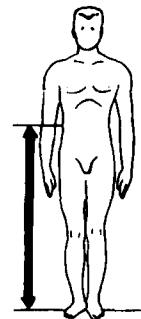
Subject stands erect. Using the anthropometer, measure the vertical distance from the standing surface to the center of the right nipple.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 47.48 | 47.84 | 51.03 | 54.52 | 55.28 |
| USAF FLYING PERSONNEL | 1967 | 47.06 | 47.54 | 50.83 | 54.37 | 55.21 |
| U.S. AIR FORCE WOMEN | 1968 | 42.88 | 43.32 | 46.50 | 50.11 | 51.03 |
| U.S. ARMY AVIATORS | 1970 | - | - | - | - | - |
| U.S. NAVY ENLISTED | 1966 | - | - | - | - | - |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 47.25 | 47.73 | 50.97 | 54.43 | 55.18 |
| GREECE AF PILOTS | 1960-61 | 45.28 | 45.71 | 48.70 | 51.93 | 52.87 |
| ITALY AF PILOTS | 1960-61 | 44.72 | 45.16 | 48.74 | 52.17 | 53.11 |
| IRAN AF TOTAL | 1970 | - | - | - | - | - |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 46.65 | 47.13 | 50.00 | 53.43 | 53.86 |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KOREA - ROKAF PILOTS | 1961 | 45.23* | 45.55 | 48.35 | 50.79 | 51.60* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 45.08 | 45.47 | 48.39 | 51.65 | 52.36 |
| U.S. ARMY WOMEN | 1977 | 42.57 | 43.02 | 46.53 | 50.31 | 51.21 |

Dimension Name: WAIST HEIGHT (OMPHALION)

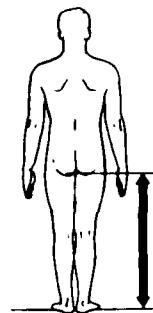
Subject stands erect. Using the anthropometer, measure the vertical distance from the standing surface to the center of the umbilicus.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 39.01 | 39.37 | 42.23 | 45.32 | 45.99 |
| USAF FLYING PERSONNEL | 1967 | 38.42 | 38.85 | 41.91 | 44.99 | 45.76 |
| U.S. AIR FORCE WOMEN | 1968 | 36.29 | 36.64 | 39.43 | 42.47 | 43.24 |
| U.S. ARMY AVIATORS | 1970 | 38.00 | 38.42 | 41.77 | 44.98 | 45.87 |
| U.S. NAVY ENLISTED | 1966 | - | - | - | - | - |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 38.55 | 38.98 | 42.02 | 45.18 | 45.97 |
| GREECE AF PILOTS | 1960-61 | 36.30 | 36.65 | 39.53 | 42.52 | 43.39 |
| ITALY AF PILOTS | 1960-61 | 36.22 | 36.61 | 39.96 | 42.99 | 43.90 |
| AF TOTAL | 1970 | - | - | - | - | - |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 37.91 | 38.54 | 40.91 | 44.06 | 44.88 |
| JAPAN AF PILOTS | 1972 | 35.04* | 35.63 | 37.83 | 40.35 | 40.99* |
| KOREA - ROKAF PILOTS | 1961 | 37.83* | 38.23 | 40.94 | 43.43 | 44.35* |
| RAF AIRCREW | 1970-71 | 38.56 | 39.00 | 42.22 | 45.56 | 46.85 |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | 39.56* | 40.08* | 43.85* | 47.60* | 48.53* |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 36.54 | 36.81 | 39.33 | 42.32 | 42.91 |
| U.S. ARMY WOMEN | 1977 | 36.23 | 36.70 | 39.84 | 43.43 | 44.36 |

Dimension Name: GLUTEAL FURROW HEIGHT

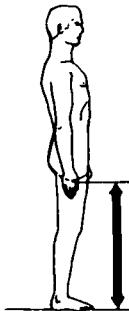
Subject stands erect. Using the anthropometer, measure the vertical distance from the standing surface to the furrow where the gluteal curve intersects the back of the thigh.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 29.16 | 29.48 | 31.96 | 34.69 | 35.30 |
| USAF FLYING PERSONNEL | 1967 | 28.98 | 29.37 | 31.90 | 34.61 | 35.30 |
| U.S. AIR FORCE WOMEN | 1968 | 25.84 | 26.16 | 28.57 | 31.26 | 31.92 |
| U.S. ARMY AVIATORS | 1970 | - | - | - | - | - |
| U.S. NAVY ENLISTED | 1966 | - | - | - | - | - |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 29.07 | 29.42 | 32.04 | 34.70 | 35.31 |
| GREECE AF PILOTS | 1960-61 | 27.28 | 27.56 | 29.88 | 32.44 | 33.27 |
| ITALY AF PILOTS | 1960-61 | 26.97 | 27.40 | 30.31 | 32.95 | 33.66 |
| IRAN AF TOTAL | 1970 | - | - | - | - | - |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 28.82 | 28.90 | 31.14 | 33.86 | 34.06 |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KOREA - ROKAF PILOTS | 1961 | 26.28* | 26.61 | 28.86 | 30.94 | 31.43* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 27.36 | 27.64 | 29.92 | 32.36 | 32.99 |
| U.S. ARMY WOMEN | 1977 | 26.17* | 26.74 | 29.10 | 31.90 | 32.46* |

Dimension Name: CROTCH HEIGHT

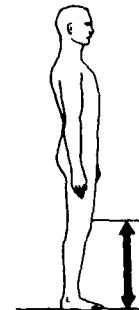
Subject stands erect, legs slightly apart. Hold the anthropometer vertically in front of the subject and raise the instrument arm between the scrotum and right leg. Have the subject ring his heels together and raise the instrument arm until it presses firmly against the flesh of the midpoint of the crotch. Measure the indicated distance above the standing surface.



| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|--------|--------|--------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 30.32 | 30.65 | 33.15 | 35.99 | 36.62 |
| USAF FLYING PERSONNEL | 1967 | 30.47 | 30.84 | 33.46 | 36.23 | 36.92 |
| U.S. AIR FORCE WOMEN | 1968 | 26.50 | 26.82 | 29.28 | 32.04 | 32.73 |
| U.S. ARMY AVIATORS | 1970 | 29.09 | 29.43 | 32.24 | 35.20 | 35.98 |
| U.S. NAVY ENLISTED | 1966 | 39.35* | 29.88 | 32.72 | 35.83 | 36.45* |
| U.S. MARINE CORPS ENLISTED | 1966 | 29.63* | 30.12 | 33.03 | 36.14 | 36.78* |
| U.S. ARMY SOLDIERS | 1966 | 29.59* | 30.04 | 33.03 | 36.10 | 36.82* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 29.75* | 30.28 | 32.40 | 34.57 | 34.90* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 29.96 | 30.34 | 33.18 | 35.93 | 36.56 |
| GREECE AF FLYING PERSONNEL | 1960-61 | 28.70 | 29.06 | 31.54 | 34.13 | 34.96 |
| ITALY AF FLYING PERSONNEL | 1960-61 | 28.50 | 28.90 | 31.77 | 35.67 | 35.16 |
| IRAN AF TOTAL | 1970 | 26.82 | 27.17 | 29.98 | 32.84 | 33.48 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 30.00 | 30.35 | 32.52 | 35.12 | 35.87 |
| JAPAN AF PILOTS | 1972 | 26.57* | 27.09 | 29.02 | 31.42 | 31.85* |
| KOREA - ROKAF PILOTS | 1961 | 27.03* | 27.24 | 29.65 | 32.05 | 32.48* |
| RAF AIRCREW | 1970-71 | 30.52 | 30.91 | 33.60 | 36.49 | 37.32 |
| RAAF AIRCREW RATED | 1973 | 30.04* | 28.90 | 32.20 | 35.51 | 36.38* |
| RCAF PILOTS | | 30.58* | 30.79 | 33.19 | 35.79 | 36.70* |
| RNZAF FLYING PERSONNEL | 1974 | 29.44* | 29.84* | 32.69* | 35.55* | 36.24* |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF FLYING PERSONNEL | 1960-61 | 28.19 | 28.54 | 30.98 | 33.54 | 34.09 |
| U.S. ARMY WOMEN | 1977 | 27.01 | 27.37 | 29.97 | 33.04 | 33.75 |

Dimension Name: PATELLA HEIGHT, TOP

Subject stands. Using the anthropometer, measure the vertical distance from the standing surface to the landmark on the right knee indicating the top edge of the patella

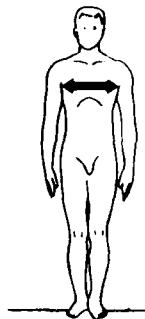


| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|----------------------------|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 19.06 | 19.27 | 20.96 | 22.75 | 23.20 |
| USAF FLYING PERSONNEL | 1967 | 18.86 | 19.10 | 20.69 | 22.42 | 22.88 |
| U.S. AIR FORCE WOMEN | 1968 | - | - | - | - | - |
| U.S. ARMY AVIATORS | 1970 | 18.22 | 18.44 | 20.14 | 21.94 | 22.40 |
| U.S. NAVY ENLISTED | 1966 | 18.54* | 18.90 | 20.79 | 22.91 | 23.34* |
| U.S. MARINE CORPS ENLISTED | 1966 | 18.29* | 18.70 | 20.71 | 23.07 | 23.49* |
| U.S. ARMY SOLDIERS | 1966 | 18.41* | 18.74 | 20.79 | 22.99 | 23.43* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | - | - | - | - | - |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 18.47 | 18.74 | 20.64 | 22.51 | 22.91 |
| GREECE AF PILOTS | 1960-61 | 17.72 | 17.91 | 19.45 | 21.06 | 21.57 |
| ITALY AF PILOTS | 1960-61 | 17.68 | 17.91 | 19.57 | 21.38 | 21.89 |
| IRAN AF TOTAL † | 1970 | 17.65 | 17.85 | 19.39 | 21.07 | 21.42 |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 18.35 | 18.78 | 20.39 | 22.20 | 22.52 |
| JAPAN AF PILOTS | 1972 | - | - | - | - | - |
| KOREA - ROKAF PILOTS | 1961 | 17.56* | 17.95 | 19.25 | 20.83 | 21.20* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 17.72 | 17.87 | 19.33 | 21.02 | 21.57 |
| U.S. ARMY WOMEN | 1977 | 17.02 | 17.24 | 18.80 | 20.67 | 21.09 |

† Measurement was designated "knee height"

Dimension Name: CHEST BREADTH (SKIN)

Subject stands erect with his arms initially raised and then lowered when the instrument is in place. Holding the instrument at the level of the subject's nipples, measure the horizontal breadth of the chest with light skin contact during normal breathing.

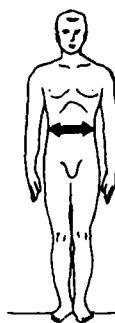


| GROUP | SURVEY YEAR | PERCENTILES | | | | |
|--|----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 11.46 | 11.62 | 12.84 | 14.29 | 14.68 |
| USAF FLYING PERSONNEL | 1967 | 11.44 | 11.60 | 12.86 | 14.37 | 14.81 |
| U.S. AIR FORCE WOMEN | 1968 | 9.73 | 9.87 | 10.96 | 12.36 | 12.77 |
| U.S. ARMY AVIATORS | 1970 | 11.89 | 12.08 | 13.50 | 15.14 | 15.66 |
| U.S. NAVY ENLISTED | 1966 | 10.35* | 10.63 | 11.81 | 13.31 | 13.54* |
| U.S. MARINE CORP ENLISTED | 1966 | 10.71* | 10.94 | 12.09 | 13.39 | 13.62* |
| U.S. ARMY SOLDIERS | 1966 | 10.44* | 10.75 | 11.97 | 13.54 | 13.77* |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 11.27* | 11.42 | 12.60 | 14.06 | 14.15* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 10.71 | 10.90 | 12.21 | 13.83 | 14.29 |
| GREECE AF PILOTS | 1960-61 | 10.87 | 11.02 | 12.13 | 13.58 | 13.94 |
| ITALY AF PILOTS | 1960-61 | 11.26 | 11.38 | 12.48 | 13.78 | 14.21 |
| IRAN AF TOTAL | 1970 | 10.28 | 10.42 | 11.52 | 13.14 | 13.63 |
| ISRAEL AF PILOTS + NAVIG. [†] | 1977 | 10.91 | 11.22 | 12.44 | 14.29 | 14.53 |
| JAPAN AF PILOTS | 1972 | 10.60* | 10.87 | 11.97 | 13.23 | 13.51* |
| KOREA - ROKAF PILOTS | 1961 | 10.57* | 10.91 | 11.93 | 13.31 | 13.55* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | 11.35* | 11.50 | 12.99 | 14.37 | 14.75* |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 11.02 | 11.18 | 12.24 | 13.62 | 14.06 |
| U.S. ARMY WOMEN | 1977 | 9.86 | 9.99 | 11.08 | 12.37 | 12.77 |

[†] Measurement taken slightly above, rather than at, the nipple level.

Dimension Name: WAIST BREADTH (OMPHALION)

Subject stands erect. Holding the anthropometer horizontally, measure the breadth between the left and right omphalion waist landmarks.



| GROUP | SURVEY, YEAR | PERCENTILES | | | | |
|----------------------------|-----------------|-------------|-------|-------|-------|--------|
| | | 3 | 5 | 50 | 95 | 98 |
| U.S. NAVY AVIATORS | 1964 | 10.39 | 10.60 | 11.97 | 13.34 | 13.73 |
| USAF FLYING PERSONNEL | 1967 | 10.50 | 10.70 | 12.15 | 13.79 | 14.29 |
| U.S. AIR FORCE WOMEN | 1968 | 8.22 | 8.35 | 9.44 | 10.85 | 11.27 |
| U.S. ARMY AVIATORS | 1970 | - | - | - | - | - |
| U.S. NAVY ENLISTED | 1966 | - | - | - | - | - |
| U.S. MARINE CORPS ENLISTED | 1966 | - | - | - | - | - |
| U.S. ARMY SOLDIERS | 1966 | - | - | - | - | - |
| U.S. ADULTS - MEN | 1960-62 | - | - | - | - | - |
| U.S. ADULTS - WOMEN | 1960-62 | - | - | - | - | - |
| FRENCH PILOTS | 1973 | 10.43* | 10.67 | 11.73 | 13.19 | 13.52* |
| GERMAN AF FLYING PERSONNEL | 1967-68 | 9.54 | 9.72 | 11.11 | 12.62 | 12.98 |
| GREECE AF PILOTS | 1960-61 | 10.31 | 10.43 | 11.46 | 12.80 | 13.27 |
| ITALY AF PILOTS | 1960-61 | 10.47 | 10.59 | 11.77 | 13.27 | 13.82 |
| IRAN AF TOTAL | 1970 | - | - | - | - | - |
| ISRAEL AF PILOTS + NAVIG. | 1977 | 10.08 | 10.28 | 11.38 | 13.82 | 14.37 |
| JAPAN AF PILOTS | 1972 | 9.39* | 9.65 | 10.71 | 12.01 | 12.25* |
| KOREA - ROKAF PILOTS | 1961 | 8.91* | 9.21 | 10.16 | 11.61 | 11.68* |
| RAF AIRCREW | 1970-71 | - | - | - | - | - |
| RAAF AIRCREW RATED | 1973 | - | - | - | - | - |
| RCAF PILOTS | | - | - | - | - | - |
| RNZAF FLYING PERSONNEL | 1974 | - | - | - | - | - |
| SWEDEN AF FLYING PERSONNEL | 1971 | - | - | - | - | - |
| TURKEY AF PILOTS | 1960-61 | 10.00 | 10.16 | 11.26 | 12.80 | 13.35 |
| U.S. ARMY WOMEN | 1977 | 8.56 | 8.70 | 9.96 | 11.81 | 12.49 |

NOTE ON GRIP DIAMETER ESTIMATION

Due to the lack of grip diameter measurements, grip diameters were estimated based on the few available measurements. It was assumed that grip diameters were largely dependent on hand lengths. Then, the ratio between a known country's grip diameter and its hand length will be roughly proportional to the ratio between another country's unknown grip diameter and its hand length. That is:

$$\frac{\text{KGD}}{\text{KHL}} = \frac{\text{XGD}}{\text{XHL}}$$

where K stands for the country whose grip diameter is known and X stands for the country whose grip diameter is unknown.

For the inside grip diameter, measurements were available from two countries, Korea and Japan. Average ratios were calculated for each percentile from the Korean and Japanese ratios; these ratios were then used to estimate other grip diameters.

| <u>Percentile</u> | <u>Korean Grip Diameter</u> | <u>Japan Grip Diameter</u> | <u>Average Grip Diameter</u> |
|-------------------|-----------------------------|----------------------------|------------------------------|
| | <u>Korean Hand Length</u> | <u>Japan Hand Length</u> | <u>Hand Length</u> |
| 3 | 0.251 | 0.243 | 0.247 |
| 5 | 0.260 | 0.244 | 0.252 |
| 50 | 0.265 | 0.250 | 0.257 |
| 95 | 0.268 | 0.263 | 0.265 |
| 98 | 0.264 | 0.262 | 0.263 |

Multiplying the average ratios above by the hand lengths of each unknown country in each percentile gave estimations of the inside grip diameters.

The outside grip diameter values were calculated in a similar way, except that since only Korean values were available, no average ratio could be formed. The accuracy of this estimation is ± 0.1 inch at best.